8th ANNUAL DIRECTORY NUMBER

AVIATION

The Oldest American Aeronautical Magazine

McGraw-Hill Publishing Co., Inc. FEBRUARY, 1941 THIS ISSUE FIFTY CENTS

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—NEW MARTIN BOMBER
powered by DOUBLE WASPS

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EIGHTH ANNUAL DIRECTORY NUMBER

AVIATION

Established 1916

OLDEST AMERICAN AERONAUTICAL MAGAZINE

Aircraft in the making

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CONTENTS REGULAR EDITION **FEBRUARY 1941**

Flashes 43

Sideslips 47

Wars Progress 48

Civil Plane Production Reaches All-time High..... 50

AVIATION'S 1941 Directory

AIRCRAFT

American Civil Aircraft 52

Photographs, 3-view and detail drawings, and technical information on more than 120 airplanes. All manufacturers of civil planes in production are featured here.

1 to 3 seats..... 53 — 4 and 5 seats..... 66
6 seats and more..... 70

Military Aircraft 76

All American military aircraft, except those restricted, are presented here, with photographs, drawings and specifications if released.

AVIATION'S Specification Tables for Aircraft..... 105

Complete specifications of planes in easily detachable form.

1 to 3 seats..... 105 — 6 seats and more..... 109
4 and 5 seats..... 109 — Military aircraft 115

AVIATION'S Sketchbook of Design Detail..... 120

A wealth of new detail sketches and cutaway drawings. This section is a rich portfolio of airplane drawings.

Aircraft Manufacturers 171

An alphabetical list of all American airplane manufacturers, with addresses and key personnel. Names of distributors are included.

ENGINES

Engines for 1941..... 101

Typical engine installations from lightplane types to those of highest horsepower, shown in attractive drawings.

Engine Specification Tables..... 113

Complete specifications for all engines.

Engine Manufacturers 177

Names, addresses and key personnel of all engine builders. Distributors and authorized service stations are included.

ACCESSORIES

Accessory and Parts Manufacturers, and Sub-Contractors 185

An alphabetical listing of names, addresses and personnel.

Who Makes It?..... 218

The most complete listing ever compiled of aviation equipment, classified by products and manufacturers.

Repair Stations Certified by C.A.A...... 181

A complete listing of all approved repair stations.

Aviation Schools 182

Ground schools and types of courses offered.

Flying Equipment 139

Four New Lycoming engines.

The Aviation News..... 141

National Aviation ..... 142 — Aviation Manufacturing.... 152
Aviation People ..... 144 — Transport Aviation..... 156
Defense ..... 146 — Finance 162

By Raymond Hoadley

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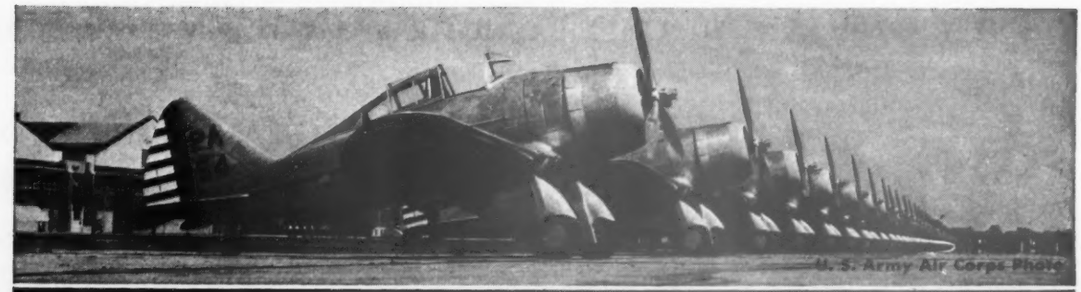
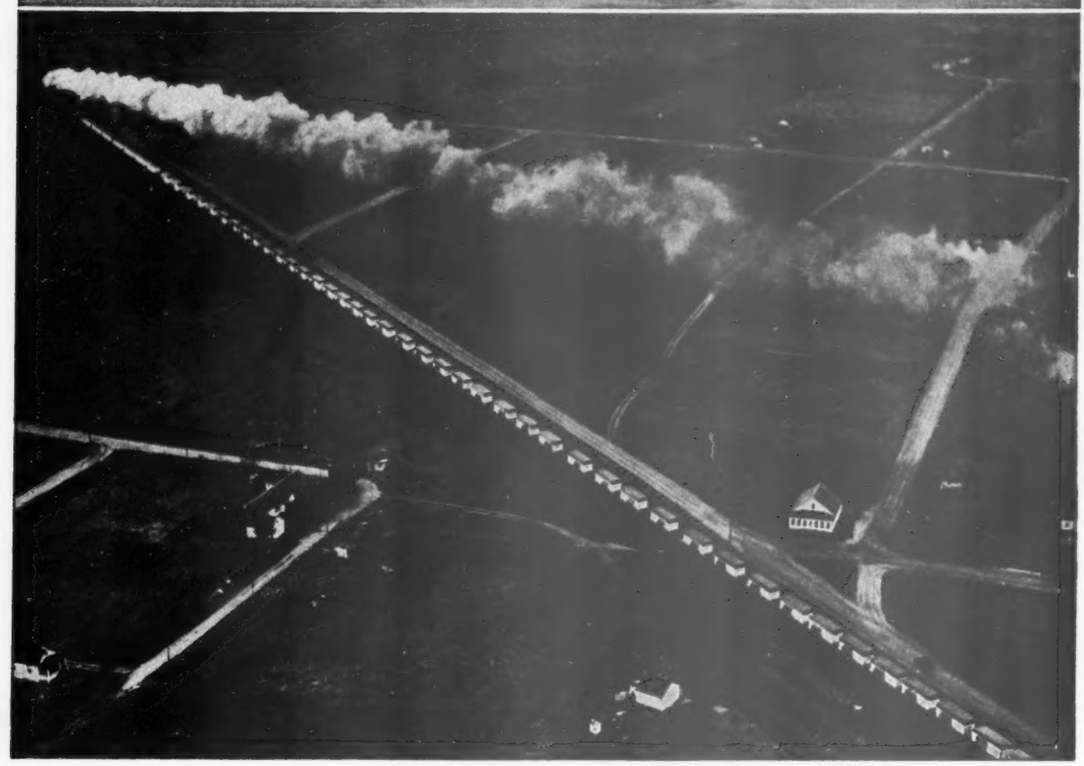


U. S. Army Air Corps Photo



REPUBLIC AVIATION

FIGHTERS ROLL OUT... 86 railroad cars haul a single shipment of Republic Aviation pursuit-interceptor airplanes consigned to the U. S. Army Air Corps. Meanwhile, twenty-four hours a day, engineers and workmen speed construction on Republic Aviation Corporation's new plant building providing 500,000 sq. ft. of additional manufacturing space, for which a giant tooling program already is well advanced. Republic Aviation is ready for today's job—as it makes ready for tomorrow's.

REPUBLIC AVIATION

REPUBLIC AVIATION CORPORATION

FARMINGDALE, LONG ISLAND, NEW YORK, U.S.A.

FLASHES

picked up along the editorial airways

Private Flying Has Its Greatest Year

» THERE is wholesome satisfaction in being able to present an issue of AVIATION dedicated to private flying while defensive preparation is seen on every side. It is our fervent hope that private flying's greatest year will not constitute a peak but will be just a stepping stone toward many greater years, and that the light plane industry will continue to expand along with military manufacturing. But the light plane makers and the manufacturers of engines and accessories for private flying must face emergency conditions squarely. It is unpleasant but not unlikely that they will be faced with priorities and with diversion of basic materials and even some of their skilled labor to the defense industries. Such drastic steps should under no circumstances be taken without absolute conviction of their necessity by those empowered to take them. But the light plane industry must not sit back and wait for these things to happen. Now is the time for you to double your design and development strength and go back to the laboratory for the answers. Somewhere in the vast resources of this nation are materials less urgently needed for defense. Somewhere in the great accumulation of aeronautical research data is the answer to increased efficiency without the eternal addition of more and more engine power. And somewhere in the manufacturing mind there is a method of building many more units with fewer workers. Never before has the commercial industry been in greater need of straight thinking, engineering, and research. And those who realize it and do something about it right now will be those who are still with us after the war.

That's not all. There are a few things for the fixed base operators to think about too. Most of you fellows in the last couple of years have made more money than you ever did before. Uncle Sam has dumped students into your laps and some of you have gotten to be a little soft on your selling. There may be some changes due in your picture. Already C.P.T.P. funds have been cut in half. Probably some of your best non-subsidized prospects have been drafted and selective service has just begun. This isn't as bad as it seems. Maybe the defense program gripes you but it is going to furnish you a prospect list bigger and better than you ever had before. There will be jobs for everyone, the ladies too. And they will have more money to spend on flying. Your job is to get out and find them, and drag them to your airport. You better get busy now if you want to keep your two-car garages full of your own automobiles.

We have digressed a little—quite a little from what we started to say. This is the largest, the most attractive and most complete Annual Directory we have ever offered. We are afraid to look at the production cost figures. It has more pictures, and three-view drawings of

During a Bombing Raid—You would never suspect that an air raid was going on while this photograph of J. H. Miller, Managing Director of Aviation Corporates Ltd., was being taken. Mr. Miller's letter is printed on the following page.

Light Airplane Exhibition
in Spotlight

THE EASTERN LIGHT AIRPLANE EXHIBITION will be an important part of this year's National Sportsmen's Show, at the Grand Central Palace, New York, February 15 to 23.

Besides popular light planes, there will be displays sponsored by the Airplane Owners and Pilots Association, the Civil Aeronautics Board, the Navy, etc.

The Texas Company has, for many years, played an important part in the aviation industry through cooperation with designers, builders, and operators in the development of more effective lubricants and fuels for aviation engines.

Because of the efficiency and economy experienced by airline operators through the use of *Texaco Aviation Gasoline* and *Airplane Oil* . . .

MORE SCHEDULED AIRLINE MILEAGE WITHIN THE U. S. AND TO OTHER COUNTRIES IS FLOWN WITH TEXACO THAN WITH ANY OTHER BRAND

The outstanding performance that has made Texaco preferred in the aviation field has also made it preferred in the fields listed in the panel.

These buyers are enjoying many benefits. You, too, will find important advantages when you use Texaco Aviation Lubricants and Fuels.

A Texaco Aviation Engineer will gladly cooperate in making savings for you. Phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

The Texas Company, *Aviation Division,* 135 E. 42nd St., New York, N.Y.

They Prefer TEXACO

- ★ More tourists use Texaco *Fire-Chief* Gasoline than any other brand.
- ★ More scheduled airline mileage within the U.S. and to other countries is flown with Texaco than with any other brand.
- ★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.
- ★ More stationary Diesel horsepower in the U.S. is lubricated with Texaco than with any other brand.
- ★ More Diesel horsepower on streamlined trains in the U.S. is lubricated with Texaco than with all other brands combined.
- ★ More railroad rolling equipment in the U.S. is lubricated with Texaco than with any other brand.

TEXACO

TEXACO DEALERS INVITE YOU TO ENJOY

FRED ALLEN in a full-hour program every Wednesday night. CBS, 9:00 E. S. T., 8:00 C. S. T., 10:00 M.S.T., 9:00 P.S.T

METROPOLITAN OPERA every Saturday afternoon, NBC. See local newspaper for time and station.

TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

airplanes and more names of companies and people than anything we have done since 1929 and in that year there were too many airplanes as we all know. In addition it has more detailed perspective sketches and cutaway drawings than we can remember in any single issue of an aeronautical publication. Complete specifications, performance, and equipment are given with each airplane photograph and three view wherever available and complete data on all airplanes and engines in production and a few that are not are condensed into our compact "easily detachable" Specification Tables for those who wish to make quick comparisons of models. The usual engine pictures are replaced where possible by perspective installation drawings which tell a far more complete story. There are many other improvements. We hope you will tell us how you like it.

» MISFORTUNE DOESN'T IMPRESS you greatly until it involves some one you know, and we are beginning to receive reports first hand from friends in England. They bring the war much closer to us. First letter was a brief note from our London colleague and front line reporter, C. G. Gray, who explained the nonappearance of manuscript we planned to publish in January. It said simply, "I have just been bombed out of house and home, and consequently my affairs are so disorganized that I cannot find time to do the article which I had promised myself I would do for the January number of AVIATION. I hope to send something really good when the mechanism of my office is in better order."

» MORE REVEALING is another note received by one of our friends from Mrs. C. G. Gray. It read—

"Just a line to say hello. We are all well. The children and I are in a primitive cottage thankfully. Charles comes for the week ends.

"Our home was blasted last Friday (November 30) large holes in the roof, windows blown out, top floor full of metal and main water pipes.

"Charles was safely here—praise be.

"The kids go to the village school and we are living next to nature. We can get eggs and onions here which are almost unheard of in town."

» ANOTHER London letter is from J. H. Millar, Managing Director of Aviation Corporates Limited, dated December 4.

"It is quite a while since I had the pleasure of seeing you and much too long since I heard how you are getting on.

"As a constant reader of 'AVIATION' I would like to take this opportunity of telling you how much the information you publish is appreciated over here and how valuable it is for us to get factual news on which we can rely.

"Among our other activities, we have been the British agents for Consolidated Aircraft Corporation of San Diego, California, since January 1939. Our work for Consolidated has necessitated close contact with the many important departments of the Air Ministry. Naturally, with Consolidated's rapidly growing business, our work for them has increased enormously.

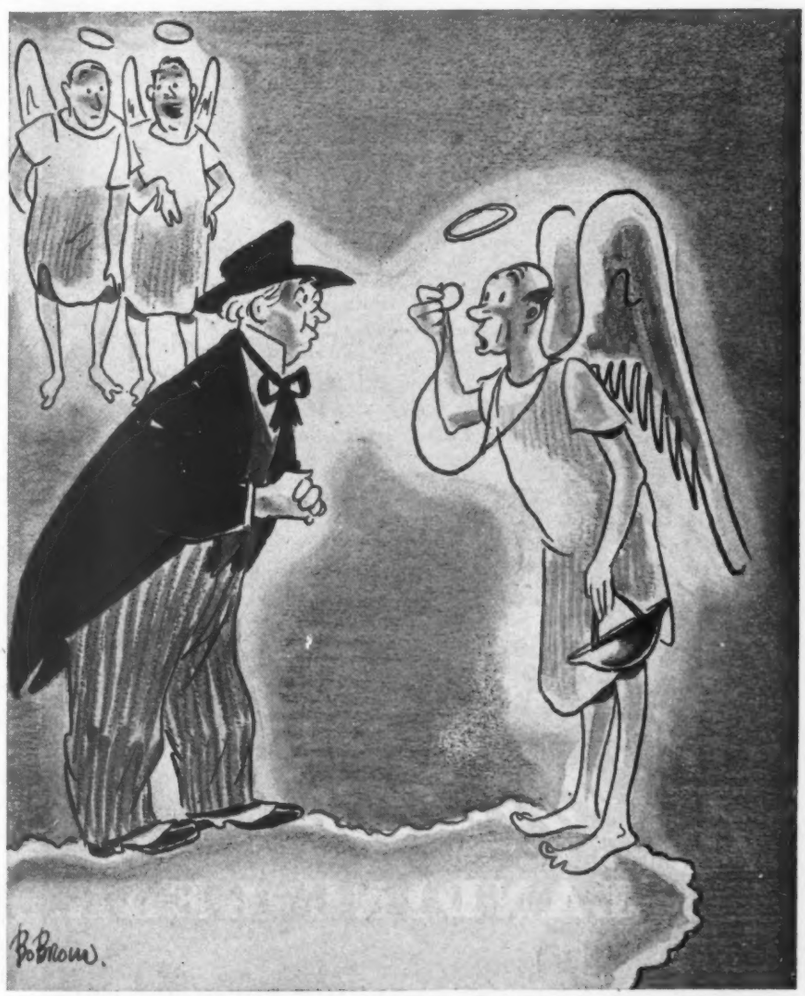
"In case you would find it interesting enough to publish in your valuable magazine, I enclose a picture that was taken recently. An air raid which was in progress at the time did not bother the photographer at all.

"It is quite exciting being here. The other night my apartment folded up all around me while I was asleep in bed. I woke up to find the window frames, curtains and shades lying across the bed, the bed itself was full of glass, and the room was full of broken bricks, rubble and pieces of concrete. Except for a few scratches I was quite unhurt.

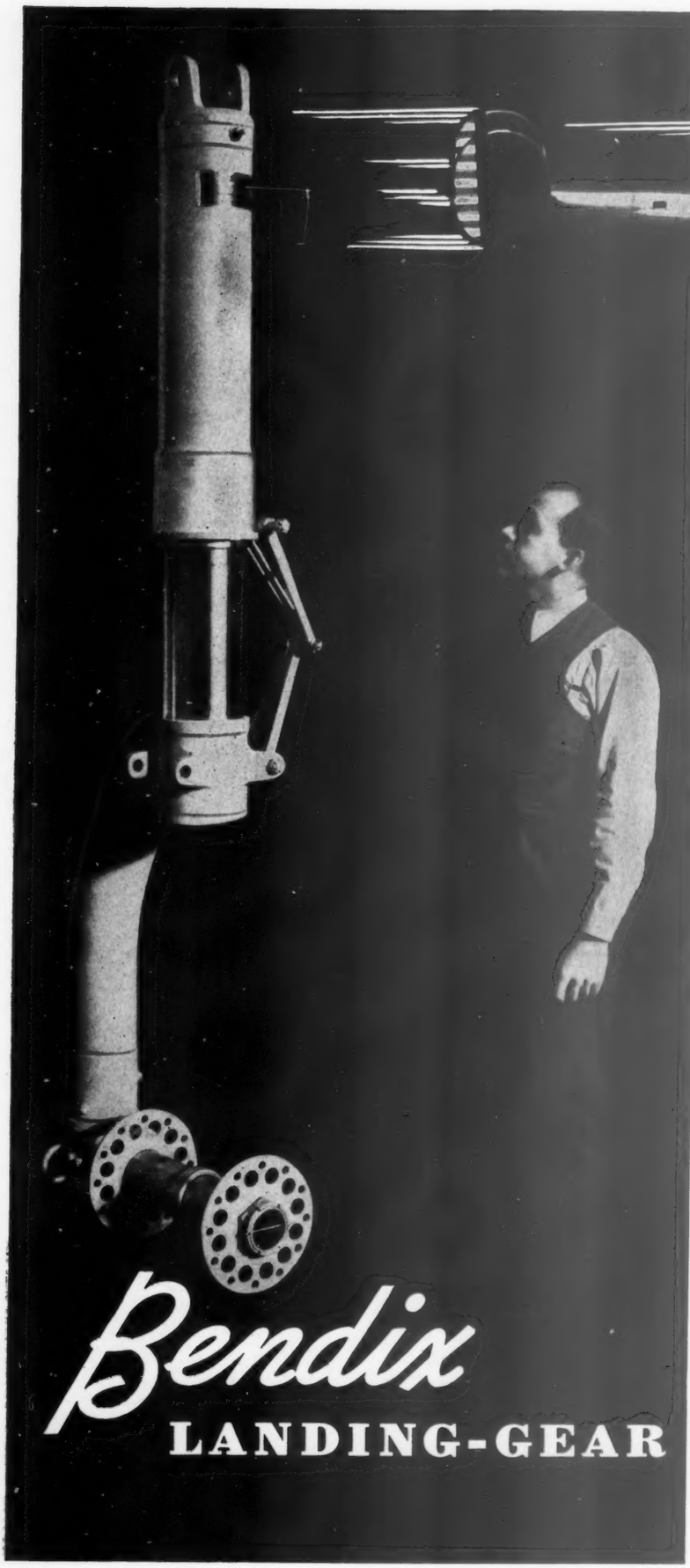
"We do not regard this as living dangerously, but driving a car in the country in the black-out when there is no moon is definitely dangerous. I was following what turned out to be a 6-ton Lorry when it pulled up suddenly in front of me on a narrow road and my car ran straight into the back and was wrecked. Fortunately I was not much hurt but on other occasions people have been seriously injured.

"We in this company will be very glad to hear from you and those in your organization who may find the time to write. If you will be good enough to publish this picture it will show our many friends in the American aviation industry that we are still alive and may remind them to write and tell us how things are going with them."

IT PAYS TO FLY



"As soon as Maguire masters that monocle, they're going to lend him to Britain!"



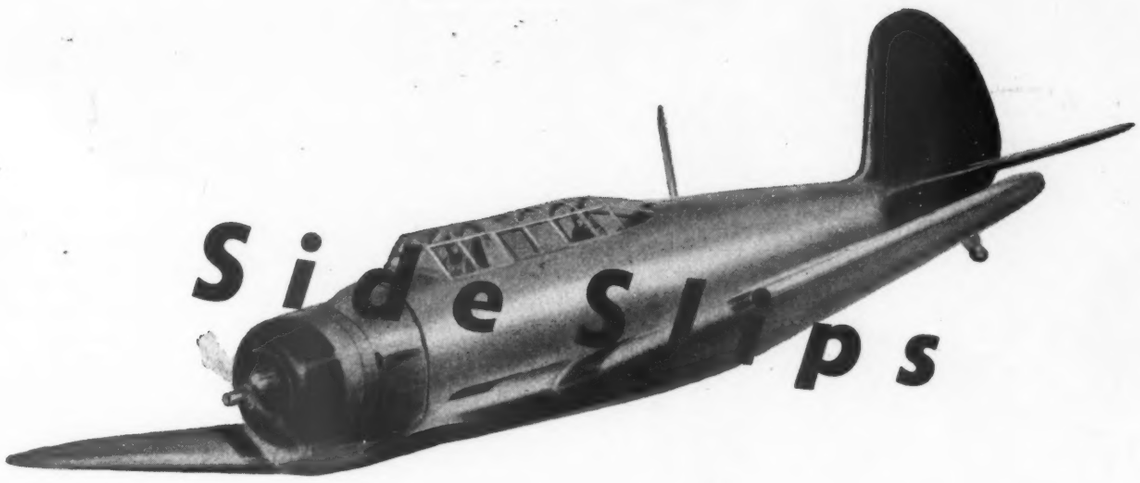
Big bombers need big "legs" and *Bendix builds them!*

Full-capacity loads of fuel and bombs mean a strenuous "workout" for the landing gear when a big bomber takes off. Frequently, the runways are none too smooth . . . and landings under still worse ground conditions are always a fair likelihood. So the extreme care with which Bendix manufacture surrounds the production of Bendix Pneudraulic Shock Struts, Aircraft Wheels and Brakes and Tail Knuckle Assemblies is a vast reassurance. Closest control over metallurgy, design, dimensioning, machining, finishing, assembly and testing is maintained, for the sake of the all-important desire of all concerned—"happy landings!"

BENDIX PRODUCTS DIVISION
OF BENDIX AVIATION CORPORATION
South Bend, Indiana

EQUIPMENT

AIRPLANE WHEELS AND BRAKES · PNEUDRAULIC SHOCK STRUTS · SWIVELABLE AND STEERABLE TAIL-KNUCKLES · PILOT SEATS



» HAVE YOU HEARD about the aircraft executives whose plants expanded so much they had to get themselves electric scooters to run around on? Well, they did. We read it in a newspaper.

This development pleases us no end. One time when we were just getting into aviation, because it had a wonderful future, a very big executive heard about a little muddle of ours and he told our immediate boss to obtain our resignation. This big executive seemed to us so high and mighty that we didn't dare go and explain things to him. Instead we fumed at night, picturing ourself walking into his office with a large shovelfull of fertilizer, and throwing it all over his desk, with a silky laugh. We didn't do it, of course, and neither did we get fired. But we never got over the ordeal; still feel meek and inferior. Or rather we did till this scooter story came along. Now, we have only to picture this executive of ours trundling down an assembly line on his scooter, and we feel as aggressive as any tom cat.

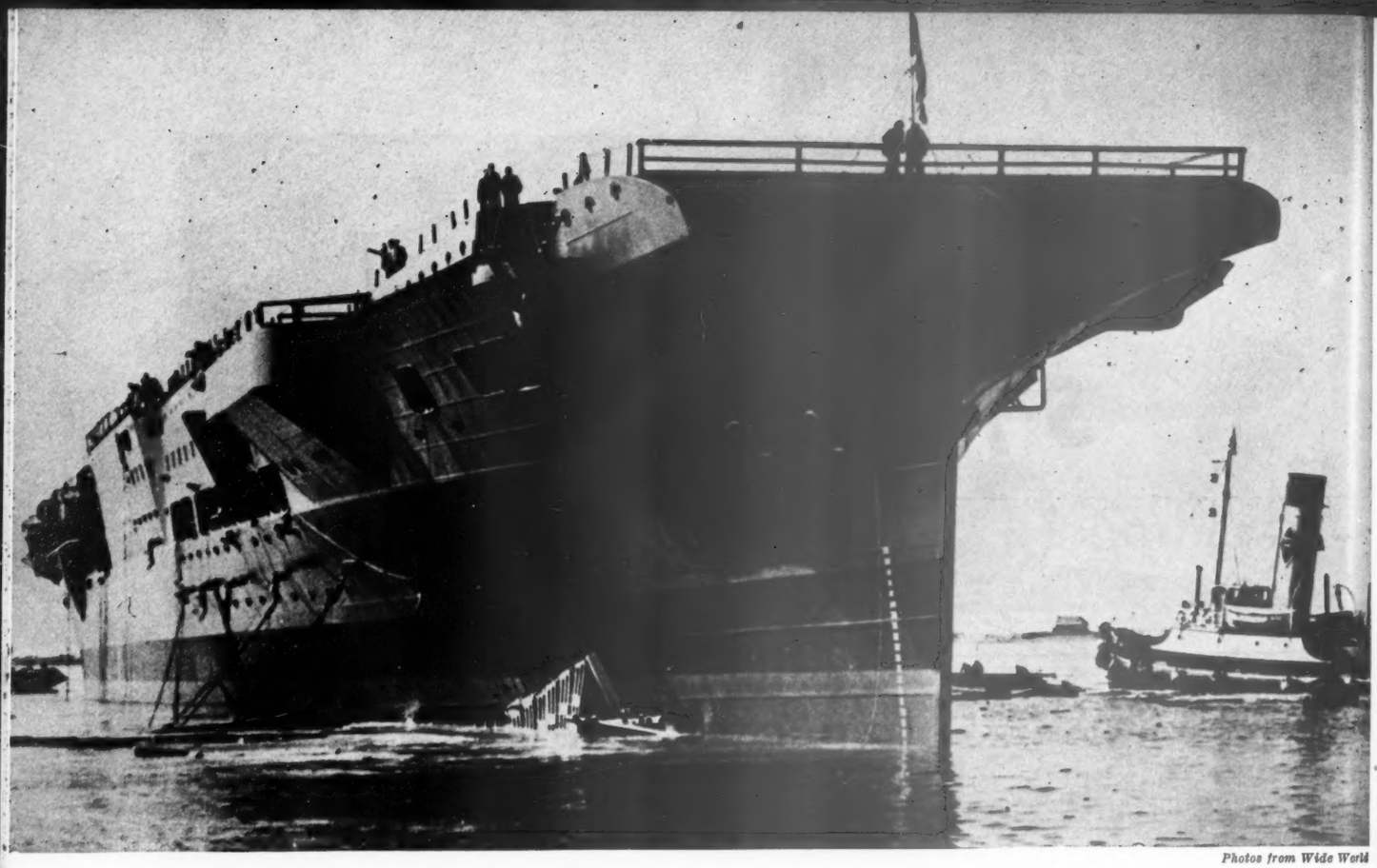
» THE OTHER DAY we were lunching, on another man's money, in a very flossy dining room with soft music and potted palm trees and breast of guinea hen under glass, when in came John Lewis, the poor man's advocate. One of our party looked at Don John and said he was reminded of the new air transport building in New York. He said that, though the building was not open, a few elevator operators were hired to handle the up and down business of general preparations. They all belong to a union. One day the union head man came along and said the building hadn't been formally dedicated yet, and the management would have to hire "hoist engineers" to run the elevators. So, the building hired hoist engineers at some fabulous wages, like $25 a day apiece. First stuff that came along to be hoisted had been manufactured by CIO, and the AFL hoisters refused to hoist it. By the time the difficulty was straightened out, it was 30 min. before quitting time.

» EVERY DAY OR TWO of late we hear somebody talking about the gasoline buggy boys muscling in on the flying machine business. Some of the popular magazine magnates are pleased, we hear; they think Detroit will have more money to spend for ads. Nearly everybody else appears to be neutral, including the Washington Administration, which is supposed to be hoping for a speed contest between the aeronauts and the autocrats. All the government wants is lots of airplanes. But some of the financial experts give you the wink and suggest that the aviation pioneers should turn over the industry just as the "emergency" ends, and let it collapse in Detroit's lap. As for us personally, we'd like to see a bit of cross-breeding. Let the two camps get together and turn out a "thrilling, exquisitely styled value sensation for 1945," that will slither out of the garage and down our country lane to the nearest landing strip, where it will spread its wings as we turn a knob, and whisk us away to the town airport, thence to the parking lot. And look here, you boy; we don't want that propeller crinkled, see!

» YOU MIGHT BE INTERESTED in knowing that Richard du Pont, the serious young man who put over the air mail pick-up system, does not want to take in the whole country. He wants to see other operators get in and start air hook lines. We've about given up making predictions, but we think that puddle-jumper mail lines will net-work all the populous regions of the United States. One good little airplane, equipped with a snatcher, can deliver and collect mail at a score of towns in an hour or two. It looks to us like a set-up for ambitious young men. In fact we know of two or three new projects that are being promoted now.

» MAN AND BOY, we've been riding in airplanes now for over 20 years. And we still think it is miraculous. While other passengers are sleeping with their mouths open, or reading newspapers during a takeoff, we are craning our neck at everything, like a first timer. This behavior always brings the stewardess to tell us what river we are crossing, how to operate the air valve, and what the altitude is. We used always to say "Listen here, young lady, we flew these things when they were made out of bamboo fishing poles." But

not any more. We found out that bragging about flying airplanes which are now in the Smithsonian museum is not the way to cut a dashing figure before these 1941 dural gals.



Photos from Wide World

The British Aircraft Carrier "Illustrious", which was severely damaged by German dive bombers, January 10.

WARS PROGRESS

Highlights from the Front and Comments on Our Own Defensive Efforts

MOST of the lessons learned so far in this phase of the war seem to be negative. A twenty mile strip of water seems to have upset the Continental technique of the "Blitzkrieg." Skies full of bombers appear to have done little more than to present a better target for determined defenders and to push to prohibitive proportions the loss ratios of attackers. Adequate defense against night bombing remains unsolved but best British brains are hard at work on it. When this is accomplished the next step may be heavy attacks on shipping beyond the easy range of shore based fighters and unhampered by heights necessary to stay out of range of anti-aircraft land batteries.

Then there may come the answer to the riddle of air power vs sea power. The recent sinking of the modern armored Crusier Southampton and the severe damage to the Carrier Illustrious by heavy German dive bombing constitute the greatest proof so far of the effectiveness of aircraft against naval vessels. It is not sufficiently conclusive to recommend that we junk our navies but it is a long way from the record of the first World War when no warships were lost or severely damaged by air attack. This indicates a trend that we must not fail to recognize.

Miracle men are springing up on our side of the Atlantic with solutions to the aircraft production problem. One of the most recent was C.I.O.'s Walter P. Reuther whose plan was to use the idle capacity of the automotive industry in some strange fashion to produce 500 planes a day. Our advice to these well meaning gentlemen is to leave the number of planes per day out of their public utterances. The minute they put them in their arguments become as weighty as a chunk of beryllium. What none of them seems to understand is that nobody in this whole wide world, not even Hitler, *wants* 500 planes a day. No one would know what to do with them if he had them. Airplanes need materials, parts, man-hours of labor, engines, propellers, gasoline, operating bases, organization, pilots, mechanics and morale before they constitute an air force. And even then, if you use too many of them at once to bomb a powerful adversary, you are just making it easier for the enemy to hit a larger proportion of them. The Germans found that out last summer when their losses compared with the British reached alarming proportions. A few figures from a recent speech of President John H. Jonett of the Aeronautical Chamber of Commerce will straighten out your thinking if you are one of those wishful ones who accept this or any other 500-a-day idea. Taxpayers will be interested in the cost,—$25,000,000 a day or $7,500,000,000 a year. Shop employees required,—1,500,000 to 2,000,000 who, with their families, would constitute a community of more than 9,000,000 persons. Machine guns needed, 4,000 a day or nearly one-half of the present annual production every day. And engine and propeller production expansion greater than that of the Biblical loaves and fishes. The age of miracles has passed. The people of the United States should appreciate that the aviation manufacturers have not gone out looking for Aaron's rod but have settled down to do the job the hard way. That is the only way to get it done.

This doesn't mean that there is no place for the auto-

motive industry in the picture. Much of its capacity can and should be used along with that of manufacturers of elevators, automatic stokers, and other devices far removed from aviation. But the place for these producers is in the great army of subcontractors and sub-subcontractors who will be needed to spread the productive efforts. Before the present expansion most of the aircraft factories and one of the two largest engine factories attempted to make as much as possible of the finished product under the home roof. Some of the large plane factories were combinations of landing gear plants, seat plants and many other kinds of plants. Now, with increased quantity orders, many are becoming primarily assembly plants. You cannot walk through any of the large factories without seeing the effects on manufacturing methods of larger quantity orders. One plant actually has a perfectly straight assembly line which it plans to develop into a belt conveyor system.

These production methods were completely impracticable in the days when 100 to 150 ships of the same type constituted a record order and might be spread over a year or two. We must not forget that these dark days are not very far behind us.

The aircraft industry is seizing every possible opportunity to devise and introduce production methods adaptable to the larger numbers of parts it must produce. But that number may never reach the high proportions of the automobile industry and the methods cannot be the same. With the high strength—weight ratios required for everything that must fly plus the exacting specifications and inspections required by the military services, there can be no comparison of quality with automotive parts and assemblies.

Most of the automotive manufacturers have found and are finding that they must start from scratch to serve the aircraft industry. Only a small part of present idle capacity could be used for airplane or engine parts manufacturing. The most successful automotive subcontractors will be those who build new plants or retool old ones.

There is a disposition of press and public to assume that the large scale automotive subcontracting plans now in formulation in Washington are going to start to-morrow. Actually most of them are a year or more away. They are being devised to supplement the present program. It will probably be well toward the fall or later before deliveries of basic materials, shortages in light alloy castings and forgings, and engine, propeller, and critical sub-assembly production problems are satisfactorily straightened out.

A leap in the production curve may be expected this year but it will be heavily weighted by trainers and properly so

The modern armored cruiser "Southampton", sunk in the January 10 dive bombing attack.

A. I. Lombard heads Production Planning Section, Division of Aircraft Production, of O.P.M.

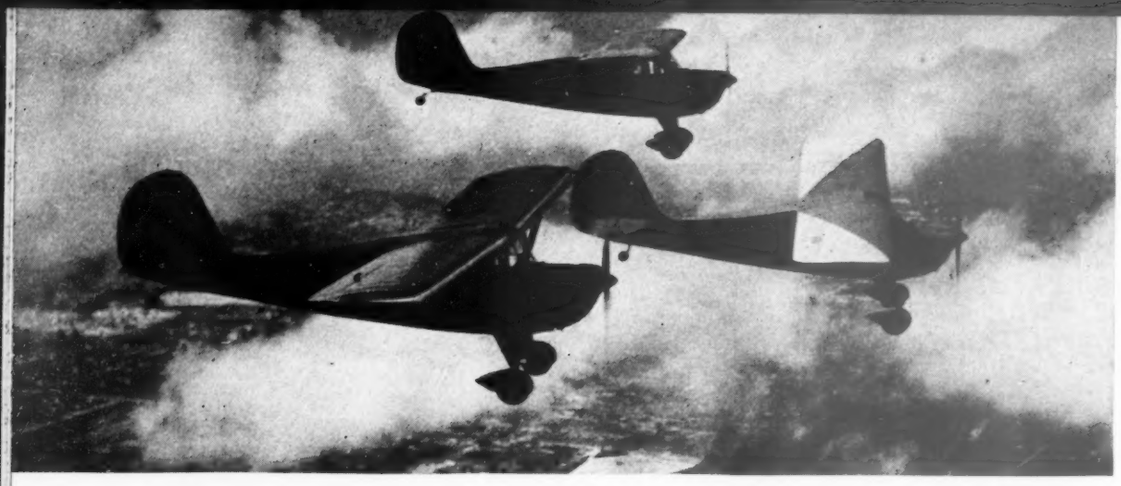
T. P. Wright, who goes to Washington as Associate Director of Aircraft Production for O.P.M.

because we must have pilots as well as planes. The total poundage of planes therefore will not increase as rapidly as the numbers of units produced. In December the production score was 799 airplanes. The estimate published in AVIATION for January (The Truth About the Defense Program by T. P. Wright) was about 750. The difference was due to an unexpected flurry of engines for some airplanes that had been standing on "glider lines". By February we should be up to 1000 per month and we should double this rate by fall.

No matter what we do this will be the critical year for the British. With one-half of our plane production, England should attain equality with Axis production rates by summer but air force parity will not be reached until the spring of 1942. If Germany waits beyond next fall, her chances of victory will diminish very rapidly. It is therefore reasonable to expect major Nazi operations at any moment.

Meanwhile our own defense effort is being strengthened by streamlining the Defense Commission and creation of the Office of Production Manager. Last month we published an article in which the author said that one total defense fundamental was "the determination to sacrifice a normal comfortable way of life and to work increasingly and uncomplainingly to attain the desired end." Since that was written it has been put into practice. T. P. Wright has gone to Washington as Associate Director of Aircraft Production for the newly formed O.P.M. And if you think his job is going to be fun, go down and try it for a day or two. Ted Wright sweltered all last summer to get the air defense procurement program underway, and to straighten out a lot of crooked thinking. While Congress was kicking the program around or ignoring it, he went back to his old job of vice president-engineering for Curtiss-Wright. He has a broad technical background and has had more than twenty years of experience in all phases of aircraft and power plant manufacturing. He has visited, revisited and studied most of the important aircraft plants in Europe. He is thorough, sound, and impartial and is universally respected even by his competitors in business. He will give to this job far more than it ever can give to him. It is extremely fortunate for the aviation industry and for the nation that his sincerity compelled him to accept it.

Continuing his important contribution to the defense program is Dr. A. J. Lombard whose work has already attracted so much favorable attention in Washington and elsewhere. Dr. Lombard has a thorough aeronautical engineering background and has done brilliant work in research, development and design.



Increases in all phases of civilian flying have brought new markets to private builders

Civil Plane Production Reaches All-time High

MORE civilian airplanes were produced in the United States in 1940 than for the four years of 1932, 1933, 1934 and 1935. Approximately 6,870 civil planes were built last year. This is an all-time record for any single year in any country.

In a world at war, civilian aviation has practically ceased to exist in all European and Asiatic countries. The United States is the only country remaining where private flying is an important factor in the nation's aeronautical life. This state of affairs is due to the sober fact that we have not become involved in the war. While the war has eliminated private flying elsewhere, it has been responsible for the great impetus given flying and the demand for light planes by the Civilian Pilot Training Program.

The 6,870 civilian planes built in this country last year were nearly twice as many as the number built in 1939, when 3,715 such planes were produced. More than 6,000 of these airplanes were in the light plane group. The balance was composed of larger ships for various private and nonscheduled purposes and for airline use.

The trend in lightplanes was strongly away from the 50 hp. models to those with 65 hp. Almost no airplanes were equipped with 40 hp. engines. The radical change from 1939 to 1940 is shown by the figures from one manufacturer of light engines. In 1939 some 78 percent of his engines were of 50 and 55 hp. and only 21 percent were of 65 hp. Last year 13.5 percent of his engines were 50 and 55 hp. and 84.5 percent were of 65 hp. This transition to greater horsepower is seen all through the lightplane field.

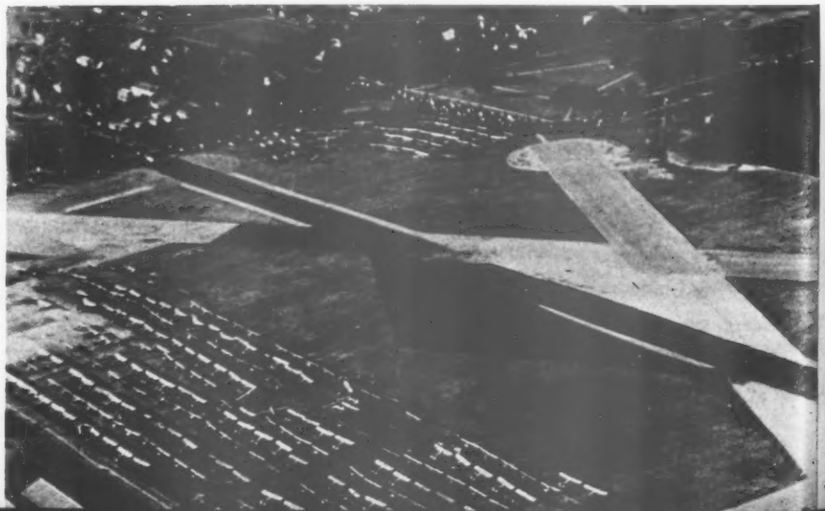
Piper Aircraft Corporation again led the procession. A total of 3,013 airplanes were delivered during 1940. This is about 60 percent more than the 1939 figure. Of this number, 1,977 were Trainers, 541 were Coupes and 495 were Cruisers. Approximately 76 percent of the planes were kept by operators for instruction and the balance went directly to private pilots. During the year Piper added some 73,000 square feet of floor space and may very likely add that much more this year.

Production figures at Piper for six years, beginning in 1935, are as follows: 228, 523, 683, 731, 1806 and 3,013. Output last year was 1221 percent over the 1935 production.

Undoubtedly the greatest percentage gain in the lightplane field was that of Taylorcraft, who stepped up production some 92 percent over 1939. The plant at Alliance, Ohio turned out 924 airplanes, as compared with 480 in the previous year. Of this number 58 percent were Taylorcraft Deluxes and 42 percent were Trainers. However, as many of the Deluxe models were used for training it is safe to say that over 500 of these ships became part of the civilian training program for national defense. During the year orders for over 1,000 planes were received. Eighty percent were for 65 hp. models. Since June production has been at the rate of about 25 planes per week. The new plant just completed will have a capacity of 2,000 planes per year on one shift per day, or some 3,500 from two shifts.

The Aeronautical Corporation of America turned out 875 airplanes last year, an increase of 31 percent over the 1939 production. Aeronca got off to a slow start when floods in the spring impaired production and then further delays occurred when the factory was moved to Middletown, Ohio. During the last five months production was stepped up and reached an average of 135 per month, a rate of 1,620 planes per year which gives an indication of what the plant can turn out. During the year some 35,000 square feet of floor space was added and at present an

All photographs from Hans Groenhoff



additional 27,500 square feet are being added. The new space will include an enlarged final assembly department, a new experimental department and a new wood shop.

Luscombe increased its airplane output by 74 percent over the 1939 amount. Last year 495 airplanes were sold as compared with 285 for the preceeding year. These all-metal planes are becoming increasingly popular at all airports. The Company found it necessary to add some 19,000 square feet to its West Trenton factory. Approximately 70 percent of the Luscombes go directly to private flyers and the balance are kept by operators for instructional purposes. Seaplanes compose about four percent of Luscombe's production. During 1940 the Silvaire was introduced, which is powered with a 75 hp. fuel injector engine.

Out in Kansas City the Porterfield Aircraft Corporation built 235 ships, a great increase over 1939 production. All of these airplanes were tandem trainers, most of which were used in the Civilian Pilot Training Program. During the year some 22,000 square feet of floor space was added to the factory and nearly that much again will be added this spring.

Stinson built 282 civil planes during the year: 260 of the 105 model, and 22 Reliants. Production was disturbed when the factory was moved from Wayne, Mich. to the large new factory at Nashville. Just after production had been nicely begun in the new plant, the company was taken over by Vultee. In order to speed up the Stinson military models it was decided to move the building of commercial planes back to Michigan. However, with new machinery and more efficient production methods, the company is looking forward to a big year in 1941.

Waco built some 266 airplanes during the year, of which number 229 were trainers. Fairchild built 142 ships not counting its military production. Of these civil planes, 97 were the popular four-place cabin ships and 45 were two-place trainers. Ryan production is now almost entirely devoted to military planes. The Air Corps and the Navy are also taking the great bulk of the Beechcrafts which are coming out of Wichita. The Company is not neglecting its commercial orders however, and last year 26 commercial biplanes were built and 7 twin-engine monoplanes.

1940 Civil Plane Production
By Engine Horsepower

50 hp. and less, 1 engine	336
2 engines	1
51–70 hp. 1 engine	4516
71–100 hp. 1 engine	1041
101–165 hp. 1 engine	176
166–225 hp. 1 engine	297
2 engines	13
226-300 hp. 1 engine	36
301–600 hp. 1 engine	61
2 engines	14
601–1800 hp. 1 engine	1
Multi-engines	136
Unclassified	42
Total single engine	6464
Total multi-engines	164
Grand total	6670

Rearwin built 90 airplanes and 101 Ken-Royce engines in its Kansas City plant. Cessna Aircraft Company of Wichita reports its plane output was approximately $900,000. Other plants building civil planes also had considerable increases over 1939.

Civilian Pilot Training Program

The great expansion in civil aviation last year can be traced directly to the government-sponsored pilot training program. During the year over 25,000 young men and women learned to fly under C.P.T.P. auspices and by the end of the year an additional 15,000 were nearing the completion of their courses. This government program has brought activity to airports throughout the country and has given impetus to all private flying. Many civilians have learned to fly on their own initiative because of activity stirred up by C.P.T. students. The lightplane boom could never have developed if fixed-base operators had not been able to buy airplanes to teach the thousands of civilian students to fly.

The number of active pilots increased from 31,829 on January 1, 1940 to some 65,000 at the end of the year. In 1935 there were only 14,000 certified pilots and the growth was steady through 1939 but then practically doubled in one year. There should be an even greater growth this year and the influence on the builders of light airplanes will be far reaching.

Production in 1940 by types of airplanes, as reported by the Civil Aeronautics Administration, is as follows: 1-2 place single-engine ships 5468; multi-engine 2; 3-5 place single-engine 978; multi-engine 14; 6-20 place multi-engine 28; 22 place and over 119. Single-engine seaplanes 17. Single-engine amphibians 1; multi-engine amphibians 1. Unclassified 42. Total single-engine airplanes 6464. Total multi-engine planes 164. Grand total 6670. It is estimated that about 200 more planes were built than this figure.

Greatest single factor in private plane boom has been the thousands of new pilots taught through the Civilian Pilot Training Program.

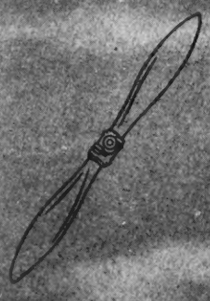
AVIATION'S

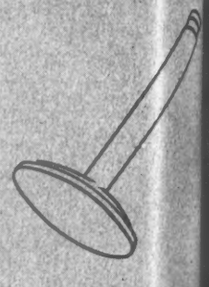
AIR SHOW-IN-PRINT

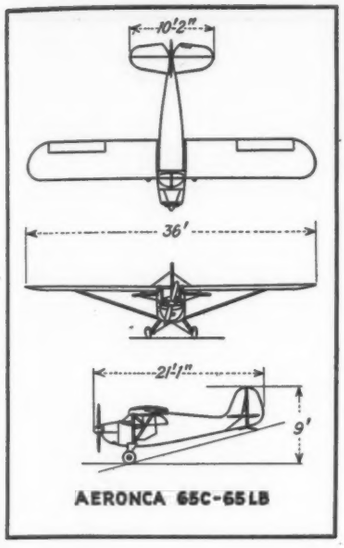
In a year when aviation facts and information are of vital national importance, Aviation's editors have devoted months of fact-gathering and research to the task of organizing the complete and up-to-date data required by the thousands of men engaged in all branches of aviation activity in this, the 8th Annual Directory Number.

More than 100 current airplanes and engines are illustrated by photographs and three-view drawings, accompanied by detail sketches and the most pertinent specifications. Supplementing these are complete specifications for all planes and engines in production—published in table form for greatest use. A greatly expanded section of Aviation's Sketchbook of Design Detail, with cutaway drawings of latest planes, also is presented.

Several distinct directory sections are included. The first presents the plane and engine manufacturers, their distributors, factory representatives and agents. The second is an alphabetical listing of accessory and material manufacturers and subcontractors. This listing is also presented in another form in which the companies are classified by the types of products that they manufacture. Approved schools and their personnel and certified repair stations also are listed.





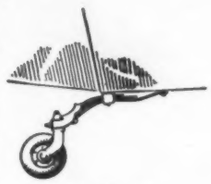


AERONCA 65C-65LB

SPECIFICATIONS: Span 36 ft., overall length 21 ft. 1 in., height overall 9 ft., landing gear tread 72 in.; wing loading 7.4 lb. per sq. ft., power loading 19.23 lb. per hp., weight empty 720 lb.; gross weight, 1250 lb. The Model 65CA is powered by a Continental engine and the Model 65LB is powered by a Lycoming engine both rated at 65 hp. at sea level. The fuel capacity is 17 gallons, normal range of 350 miles, fuel consumption at cruising speed is 4.3 gallons per hour for the CA and 4 for the LB. Diameter of the propeller is 76 in. for CA and 70 for LB. Area of wing (including ailerons) 169 sq. ft., total ailerons 19.8 sq. ft., fin 6.5 sq. ft., rudder 8.2 sq. ft., stabilizer 13.6 sq. ft., total elevators 11.54 sq. ft. Seats two.

PERFORMANCE: High speed 109 m.p.h., at sea level, cruising speed, 100 m.p.h. at sea level, stalling speed 38 m.p.h., climb at sea level 600 ft. per minute, service ceiling 15,000 ft.

CONSTRUCTION MATERIAL: Wing is made of solid spruce spars, spruce ribs, fabric covering, fuselage is of steel tubing welded, with fabric covering.



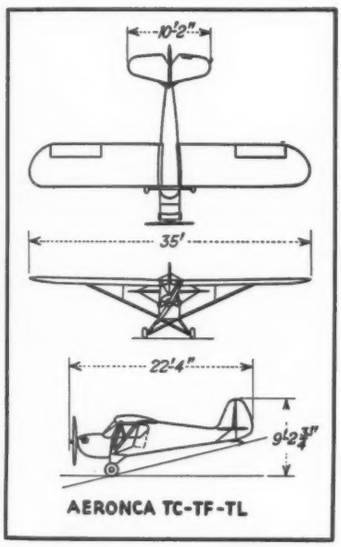
Tail Wheel

STANDARD EQUIPMENT includes air speed indicator, tachometer, oil pressure gage and oil temperature gauge, ignition switch, primer, parking brake, fuel valve, carburetor heater and recessed cabin heater controls for safety.

A. T. C. No. 675 (65CA) No. 702 (65LB)

AERONCA Model 65CA and LB

(For further specifications see table p. 105)



AERONCA TC-TF-TL

SPECIFICATIONS: The span is 35 ft., overall length 22 ft. 4 in., overall height 6 ft. 6 in., landing gear tread 70 in. Wing loading 6.8 lb. per sq. ft., power loading 17.7 lb. per hp., weight empty 700 lb., gross weight 1,150 lb. Model TL is powered by a 65 hp. Lycoming engine Model TC with a Continental, and Model TF with a Franklin, with the horsepower being developed at sea level altitude, 12 gallon fuel capacity, normal range of 250 miles, fuel consumption at cruising speed 4 gallons per hour. Propeller measures 70 in. in diameter. Wing area (including ailerons) 169 sq. ft., total ailerons 19.7 sq. ft., fin 6.5 sq. ft., rudder 8.2 sq. ft., stabilizer 13.6 sq. ft., total elevators 11.54 sq. ft. Seats 2.

PERFORMANCE of this model at sea level high speed 100 m.p.h., cruising speed 90 m.p.h., stallinging speed 35 m.p.h., climb at sea level 600 ft. per minute, service ceiling 15,000.

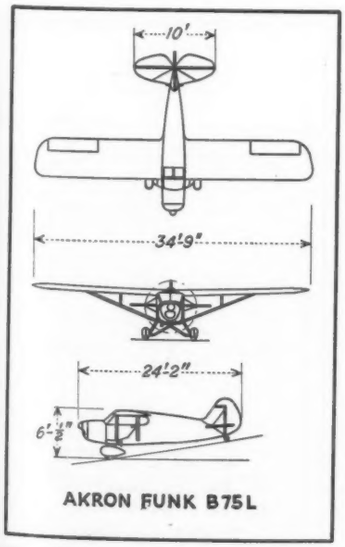
Aileron Control

A. T. C. No. 728

AERONCA Model 65TL

CONSTRUCTION MATERIAL: Spars are of solid spruce, aluminum ribs, wing covered with fabric material. The fuselage is of welded steel tubing, fabric covered. The landing gear is of fixed type, Shinn wheel, 6.00 x 6, Shinn mechanical brakes, Oleo shock unit and skid and wheel tail unit.

(For further specifications see table p. 105)



AKRON FUNK B75L

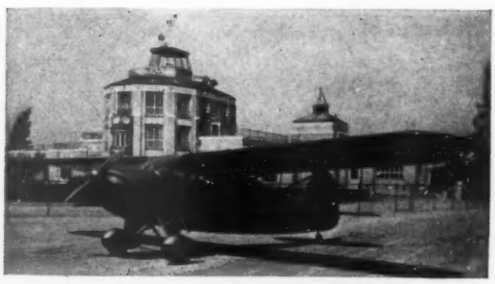
SPECIFICATIONS: The span is 35 ft., overall length 20 ft., overall height 6 ft., landing gear tread 72 in. Wing loading 8 lb. per sq. ft., power loading 18 lb. per hp., weight empty 800 lb., gross weight 1,350 lb. It is powered by a Lycoming engine rated at 75 hp. at sea level. Fuel capacity 16 gallons, normal range of 350 miles, fuel consumption at a cruising speed of 4.5 gallons per hour. Propeller diameter is 76 inches. Wing area (including ailerons) is 169 sq. ft., total ailerons 19 sq. ft., fin 4.5 sq. ft., rudder 6.94 sq. ft., stabilizer 15.2 sq. ft., total elevators 10 sq. ft. Seats two.

PERFORMANCE: High speed is 112 m.p.h. at sea level, 103 m.p.h. cruising speed at sea level. Stalling speed 37 m.p.h., 800 ft. per minute climb at sea level, 17,000 ft. service ceiling.

CONSTRUCTION MATERIAL: The wing spars are of laminated spruce, spruce ribs, and covered with fabric, Firestone landing gear wheels, Shinn mechanical brakes, Oleo landing gear shock unit and tail unit.

Engine Mount

A. T. C. No. 715

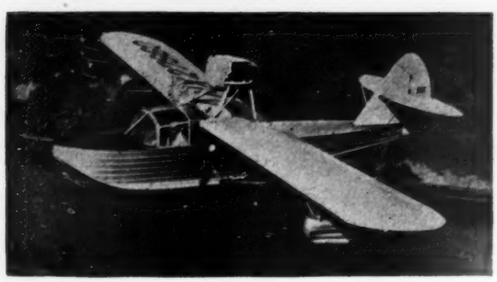


AKRON FUNK Model B75L

STANDARD EQUIPMENT: consists of tachometer, air speed indicator, oil pressure gauge and oil temperature gage, battery and case, navigation lights. Special: electric starter, radio receiver and transmitter, turning and banking indicator, and landing lights.

(For further specifications see table p. 105)

1 TO 3 SEATS

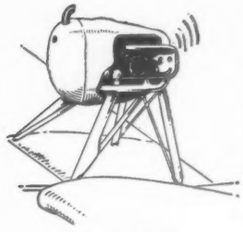


APPLEGATE Amphibian Model P. No. 1

SPECIFICATIONS: The span is 38 ft. 6 in., overall length 25 ft., overall height 8 ft., landing gear tread 58 in. Wing loading weight is 8.63 lb. per sq. ft., power loading 10.8 lb. per hp., weight empty 998 lb., gross weight 1500 lb. It is powered with a Franklin 199 engine, rated at 95 hp. at sea level, fuel capacity 33 gallons, normal range of 500 miles, fuel consumption at a cruising speed of 6 gallons per hour. The propeller measures in diameter 72 in. Wing (including ailerons) 183 sq. ft., total ailerons 19.2 sq. ft., fin 4.66 sq. ft., rudder 6.76 sq. ft., stabilizer 14.66, total elevators 10.64 sq. ft.

PERFORMANCE: High speed 102 m.p.h. at sea level, cruising speed of 85 m.p.h. at sea level, stalling speed 45 m.p.h., climb at sea level 450 ft. per minute, service ceiling 11,000 ft. Wing spars are of spruce, Nieral ribs, covered with fabric. Fuselage is aluminum alloy 525. The landing gear, skid tail unit.

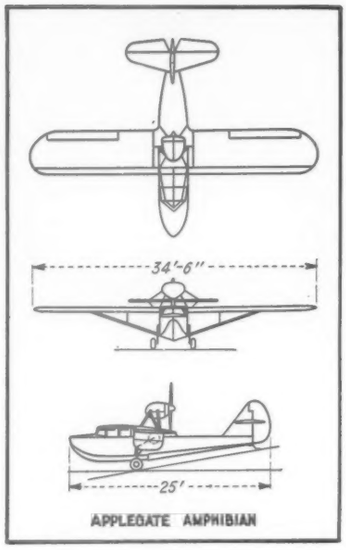
STANDARD EQUIPMENT: Consists of Cub tires and brakes, Gardner propeller, Cub seats, controls, lights, Applegate shock strut, Pneumatic wing tip floats. Seats two.



Engine Mount

(For further specifications see table p. 105)

No A. T. C.



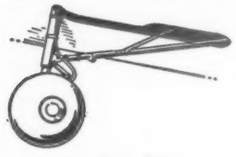
APPLEGATE AMPHIBIAN

BELLANCA Model No. 14-9 Cruisair

SPECIFICATIONS: The span is 34 ft. 2 in., length overall 21 ft. 3 in., height overall 6 ft. 3 in., landing gear tread 8 ft. 9 in. Wing loading 10.8 lb. per sq. ft., power loading 19.4 lb. per hp., weight empty 1050 lb., gross weight 1750 lb. This model is powered by a Ken-Royce or LeBlond engine, rated at 90 hp., fuel capacity 20 gallons, normal range of 420 miles, fuel consumption at cruising speed 5 gallons per hour. The propeller diameter is 74 inches. Wing (including ailerons) 162 sq. ft., total ailerons 14 sq. ft., fin 6.5 sq. ft., rudder 5.8 sq. ft., stabilizer 16.07 sq. ft., total elevators 9.36.

PERFORMANCE: High speed 133 m.p.h., cruising speed 120 m.p.h. at an altitude of 3,000 ft. Stalling speed 45 m.p.h., climb at sea level 750 ft. per minute, service ceiling 14,000 ft.

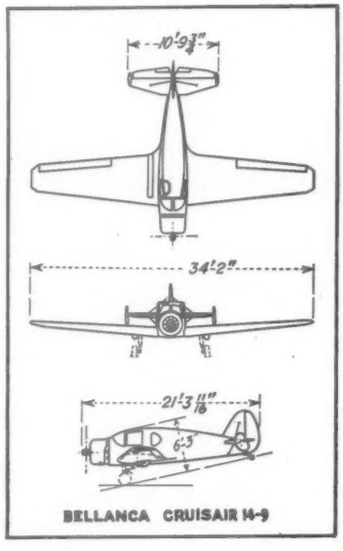
CONSTRUCTION MATERIAL: The wing spars are of spruce plank, ribs of spruce plywood, covered with plywood. Steel tubing with fabric covering is used for the fuselage. The landing gear is of retractable type, wheels measure 8.00 x 4, Goodrich and Palmer hydraulic brakes, Oleo landing gear shock unit, Oleo wheel tail unit. Plexiglas is used for cock-pit enclosures, landing-light covers, and other transparent sections. Seats 3.



Retractable Gear

(For further specifications see table p. 105)

A. T. C. No. 716



BELLANCA CRUISAIR 14-9

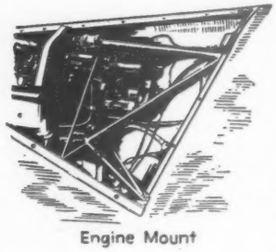
CULVER Model LCA

SPECIFICATIONS: Span is 27 ft., overall length is 17 ft. 8 in., overall height is 5 ft. 6 in., the landing gear tread is 79 in., wing loading 10.88 lb. per sq. ft., power loading 17.40 lb. per hp., weight empty 750 lb., gross weight 1,305 lb. It is powered by a Continental engine, total rated hp. is 75 at sea level, fuel capacity is 20 gallons, normal range 600 miles, fuel consumption at cruising speed 4.35 gallons per hour.

PERFORMANCE: High speed 140 miles per hour at sea level, cruising speed 120 miles per hour at sea level, stalling speed 45 miles per hour, climb at sea level 800 ft. per minute, service ceiling 17,500 ft. Seats two.

CONSTRUCTION MATERIAL: The spars are of laminated spruce wood ribs, fabric covering material, the landing gear is of retractable type, Hayes wheel, size 500 x 4, Hayes hydraulic brakes, Culver Oleo-spring landing gear shock unit, wheel tail unit, fuselage semi-monocoque.

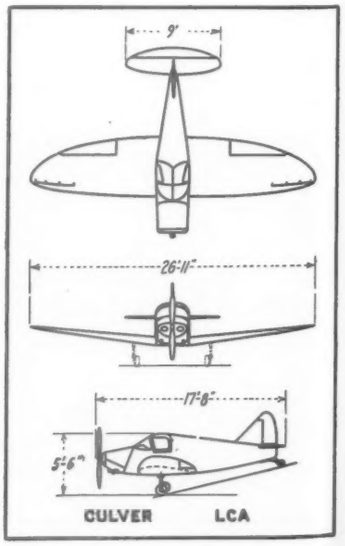
STANDARD EQUIPMENT: Oil pressure gage, oil thermometer, airspeed, altimeter, compass, ignition switch, fuel level gage, cabin heat, cabin vent, landing lights, generator, battery, position lights.



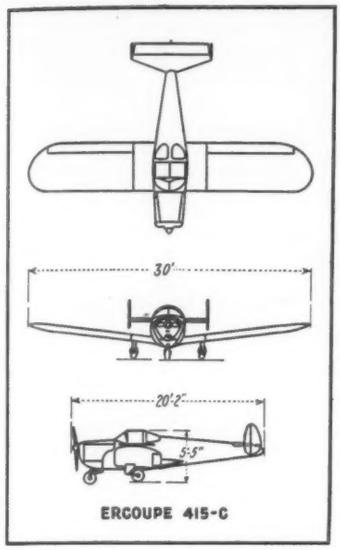
Engine Mount

(For further specifications see table p. 105)

A. T. C. No. 730



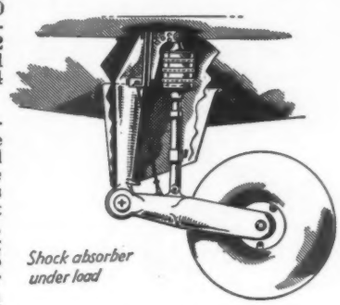
CULVER LCA



ERCOUPE 415-C

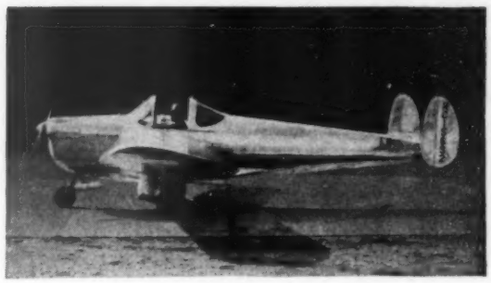
SPECIFICATIONS: The span is 30 ft., overall length 20 ft. 2 in., overall height 5 ft. 11 in., landing gear tread 84 in.; wing loading 8.2 lb. per sq. ft., power loading 18.1 lb. per hp., weight empty 716 lb., gross weight 1,175 lb.; this model is powered by a Continental engine rated at 65 hp. at sea level, fuel capacity 14 gallons, normal range 350 miles, fuel consumption at cruising speed 4 gallons per hour, diameter of propeller 72 in., area of wing (including ailerons) 142.6 sq. ft., total ailerons 16.8 sq. ft., fin 3.3 sq. ft., rudder 6.0 sq. ft., stabilizer 10.2 sq. ft., total elevators 9.4 sq. ft.

PERFORMANCE: The high speed performance is 117 miles per hour at sea level, cruising speed 105 miles per hour at an altitude of 3,000 ft.



Shock absorber under load

A. T. C. No. 718

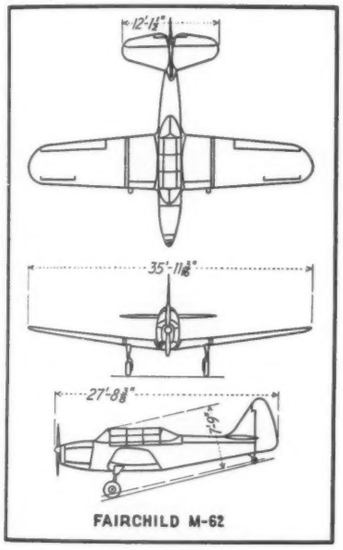


ENGINEERING & RESEARCH Model Ercoupe 415 C

stalling speed 40 miles per hour, climb at sea level 800 ft. per minute, service ceiling 14,000 ft. Seats 2.

CONSTRUCTION MATERIAL: The wing spars are of Aluminum Alloy, "I" section, the ribs are of aluminum alloy, the covering material is of aluminum alloy and fabric, fuselage is aluminum alloy, monocoque type.

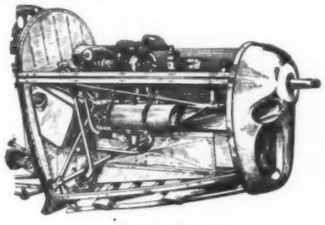
(For further specifications see table p. 105)



FAIRCHILD M-62

SPECIFICATIONS: The span is 36 ft., overall length 27 ft. 8 in., overall height 7 ft. 9 in., landing gear tread 115 in., wing loading 12.25 lb. per sq. ft., power loading 14.0 lb. per hp., weight empty 1,749, gross weight 2,450 lb., the model is powered by a Ranger engine at a total rate of 175 hp. at sea level, fuel capacity 45 gallons, normal range 550 miles, fuel consumption at cruising speed 10 gallons per hour, diameter of propeller 86 in., area of wing (including ailerons) 200 sq. ft., total ailerons 16.6 sq. ft., fin 6.9 sq. ft., rudder 14.5 sq. ft., stabilizer 26.7 sq. ft., total elevators 13.2 sq. ft. Seats 2.

PERFORMANCE: The high speed is 140 m.p.h. at



Engine Mount

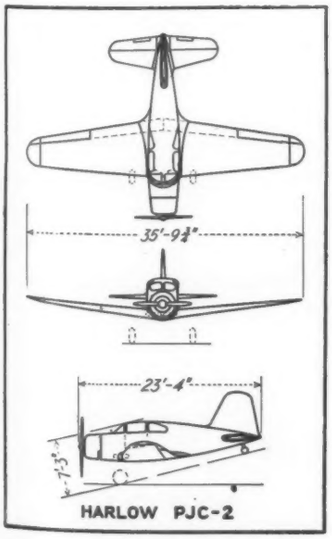
A. T. C. No. 724

FAIRCHILD Model M 62

sea level, cruising speed 120 m.p.h. at sea level, stalling speed 50 m.p.h., climb at sea level 835 ft. per minute, service ceiling 16,000 ft.

CONSTRUCTION MATERIAL: Solid spruce wing spars, aluminum alloy ribs, plywood covering material. The landing gear is of fixed type, hydraulic brakes, Oleo shock unit, wheel tail unit, the fuselage is of welded steel tubing, fabric covered.

(For further specifications see table p. 105)



HARLOW PJC-2

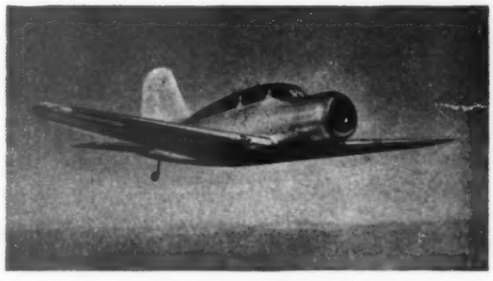
SPECIFICATIONS: The model PJC-2 is available as 2 or 4 seater, specifications for latter follow: span 35 ft. 9¾ in., overall length 23 ft. 4 in., overall height 7 ft. 3 in., wing loading 14.05 lb. per sq. ft., power loading 17.94 lb. per hp., weight empty 1,750 lb., gross weight 2,600 lb. It is powered with a Warner engine, rated at 145 hp. at sea level, fuel capacity 34 gal., cruising range 480 mi., cruising fuel consumption 9 gal. per hour, propeller diameter 84 in. Wing area (including ailerons) 185 sq. ft., aileron area (total) 13.02 sq. ft., fin area 12.58 sq. ft., rudder area 10.9 sq. ft., stabilizer area 21.2 sq. ft., total elevator area 17.12 sq. ft.

PERFORMANCE: High speed 140 m.p.h. at sea level, cruising speed 135 m.p.h., stalling speed 52 m.p.h., climb at sea level 650 ft. per min., service ceiling 12,000 ft.

CONSTRUCTION: Aluminum alloy wing spars, metal ribs, aluminum alloy covering material, retractable landing gear, 21 in. wheels, hydraulic brakes, Aircraft Products Oleo shock struts, wheel tail unit, riveted Alclad fuselage. Seats 2.

STANDARD EQUIPMENT: Pioneer, Sperry, Jaeger, Auto-Lite and Weston instruments, Lord shock

A. T. C. No. 659



HARLOW Model No. PJC-2

mountings, General tires, Air Associates brakes, Curtiss propeller. Harlow seats, Fafnir and Norma-Hoffman bearings, Auto-Lite generator and starter. Radio equipment: R.C.A., Lear, Siebenthaler and Aeronaut.

(For further specifications see table p. 105)

1 TO 3 SEATS

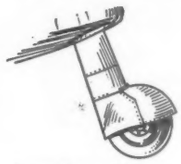
HARLOW Model PC-5

SPECIFICATIONS: Span 35 ft., 9¾ in., overall height 7 ft. 8 in., overall length 23 ft. 4 in., landing gear tread 91 in., wing loading 14.05 lb. per sq. ft., power loading 15.75 lb. per hp., weight empty 1,950 lb., gross weight 2,600 lb., powered by a Warner engine, total rated hp. 165 at sea level, fuel capacity 34 gallons, normal range 480 miles, fuel consumption at cruising speed 10 gallons per hour, diameter of propellor 84 in., wing area (including ailerons) 185 sq. ft., total aileron area 13.02 sq. ft., fin area 12.58 sq. ft., rudder area 10.9 sq. ft., stabilizer area 21.2 sq. ft., total elevator area 17.12 sq. ft. Seats two.

PERFORMANCE: High speed 154 m.p.h. at sea level, cruising speed 140 m.p.h. at sea level, stalling speed 52 m.p.h., climb at sea level 740 ft. per minute, service ceiling 14,500 ft.

CONSTRUCTION MATERIAL: Aluminum alloy wing spars, metal ribs, aluminum alloy covering material, retractable type of landing gear, 21 in. streamlined General wheels, hydraulic brakes, Aircraft Prod. Oleo landing gear shock unit, wheel tail unit, Alclad riveted fuselage.

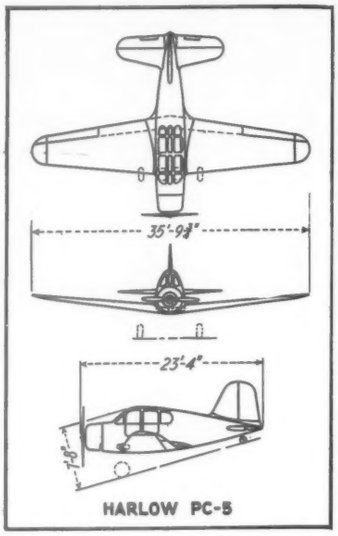
STANDARD EQUIPMENT: Airspeed, sensitive altimeter, tachometer, engine gage unit, fuel gage, compass, clock, rate of climb.



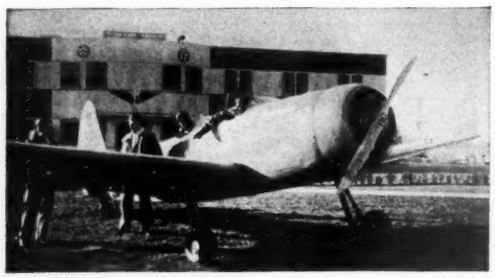
Landing Gear

(For further specifications see table p. 105)

No A. T. C.



HARLOW PC-5



HOWARD Model DGA-125

SPECIFICATIONS: Span 34 ft., overall length 26 ft. 6⅜ in., overall height 7 ft. 3 in., wing loading 11.14 lb. per sq. ft., power loading 16 lb. per hp., weight empty 1,350, gross weight 2,000 lb., landing gear tread 113½ in., powered by a Warner engine, total rated hp. 125, fuel capacity 31 gallons, normal range 365 miles, fuel consumption at cruising speed 8.3 gallons per hour, diameter of propeller 87⅝ in., wing area (including ailerons) 179.5 sq. ft., total aileron area 20.2 sq. ft., fin area 9.2 sq. ft., rudder area 6.7 sq. ft., stabilizer area 10.7 sq. ft., total elevator area 11.9 sq. ft. Seats two.

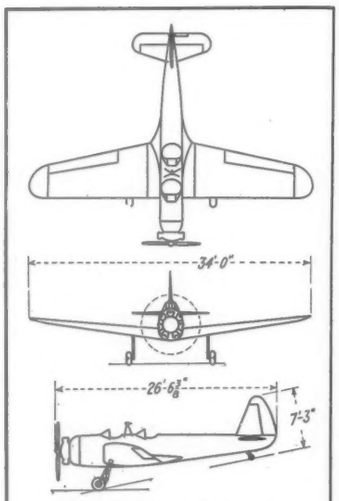
PERFORMANCE: High speed 118 m.p.h., at sea level, cruising speed 108 m.p.h. at sea level, stalling speed 50 m.p.h., climb at sea level 800 ft. per minute, service ceiling 13,500 ft.

CONSTRUCTION MATERIAL: Box spruce wing spars, plywood covering material, ribs mahogany and spruce truss and mahogany webbing, fixed type landing gear, General wheel, size 8.00 x 5, General hydraulic brakes, wheel tail unit; fuselage constructed of welded steel, fabric covering.

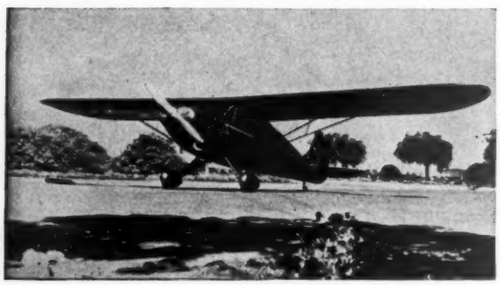
Landing Gear

(For further specifications see table p. 105)

No A. T. C.



HOWARD TRAINER DGA-125



INTERSTATE AIRCRAFT AND ENGINEERING

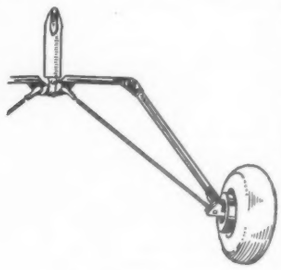
Model S-1A

SPECIFICATIONS: The span is 35 ft. 6 in., overall length 23 ft. 2 in., overall height 7 ft. 5 in., wing loading 6.9 lb. per sq. ft., power loading 18.5 lb. per hp., weight empty 700, gross weight 1,200 lb., this model is powered by a Continental or Franklin engine with the total rated hp. 65, fuel capacity 15 gallons, normal range 375 miles, diameter of propellor 76 in. Wing area (including ailerons) 173.8 sq. ft., fin 4.7 sq. ft., rudder 7.0 sq. ft., stabilizer 13.0 sq. ft., total elevators 9.8 sq. ft. Seats two.

PERFORMANCE: The high speed is 107 m.p.h., cruising speed 97 m.p.h., stalling speed 36 m.p.h., climb at sea level 700 ft. per minute, service ceiling 14,500 ft.

CONSTRUCTION MATERIAL: Spruce spars, metal ribs, fabric covering material, the landing gear is of fixed type, Shinn wheel 6.00 x 6, Shinn hydraulic brakes, Interstate oleo landing gear shock unit, tail 6.00 x 2, steerable.

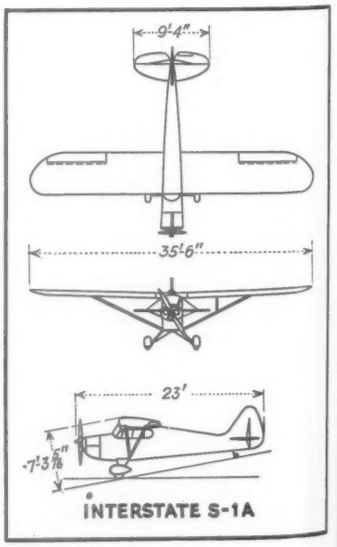
STANDARD EQUIPMENT: It is equipped with the following: altimeter, airspeed tachometer, oil pressure, oil temperature fuel gage, compass.



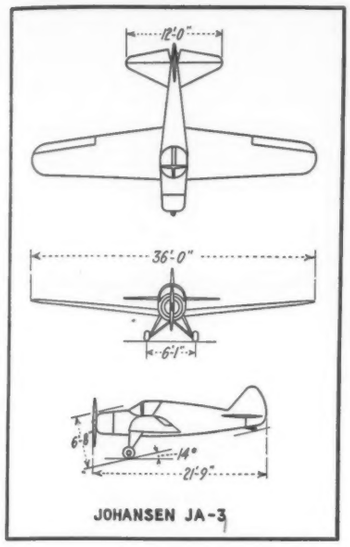
Landing Gear

(For further specifications see table p. 105)

No A. T. C.



INTERSTATE S-1A



JOHANSEN JA-3

SPECIFICATIONS: The span is 36 ft., overall length 21 ft. 9 in., overall height 6 ft. 8 in., the landing gear tread 73 in., wing loading 6.6 lb. per sq. ft., power loading 18.8 lb. per hp., empty weight 700, gross weight 1,225 lb., this model is powered by a Lycoming engine, total rated hp. 65 at sea level, fuel capacity 15 gallons, normal range 350 miles, fuel consumption at cruising speed 4.0 gallons per hour, diameter of propeller 72 in. The area of wing (including ailerons) is 185 sq. ft., total ailerons 16 sq. ft., fin 6 sq. ft., rudder 6.8 sq. ft., stabilizer 20 sq. ft., total elevators 12.5 sq. ft. Seats two.

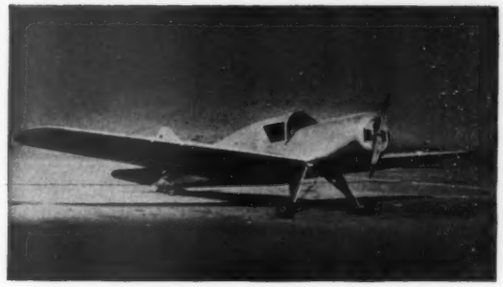
PERFORMANCE: The high speed is 108 m.p.h., at sea level, cruising speed 96 m.p.h., at sea level, stalling speed 39 m.p.h., climb at sea level 680 ft. per minute, service ceiling 15,000 ft.

CONSTRUCTION MATERIAL: Laminated spruce spars, spruce ribs, fabric covering material, the landing gear is of fixed type, air wheels 16 x 7-3, mechanical brakes, shock cord landing gear shock unit, wheel tail unit, fuselage glued spruce plywood.

Engine Mount

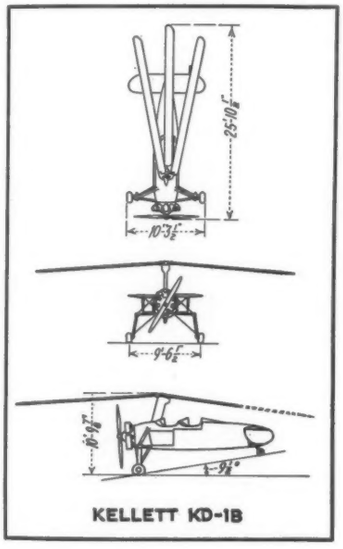
STANDARD EQUIPMENT: It is equipped with the following: air speed tachometer, oil pressure, gas gage, altimeter oil temperature.

No A. T. C.



JOHANSEN Model JA-3

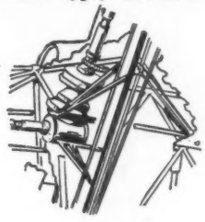
(For further specifications see table p. 105)



KELLETT KD-1B

SPECIFICATIONS: Span 40 ft., overall length 28 ft. 10 in., overall height 10 ft. 3 in., landing gear tread 114.5 in., wing loading 40.8 lb. per sq. ft., power loading 10 lb. per hp., weight empty 1,630 gross weight 2 250 lb., powered by a Jacobs engine, total rated hp. 225 at sea level, fuel capacity 30 gallons, normal range 208 miles, fuel consumption at cruising speed 14.0 gallons per hour, diameter of propeller 102 in., area of wing (including ailerons) 55.2 sq. ft., fin 12.0 sq. ft., rudder 3.2 sq. ft., stabilizer 22.0 sq. ft. Seats one.

CONSTRUCTION MATERIAL: Spars are of steel tubing, plywood ribs, fabric covering material. The landing gear is of fixed type, Goodrich wheel 7.00 x 5, Hayes mechanical brakes, Bendix Oleo landing gear shock unit, tail wheel unit, fuselage welded steel tubing, fabric covered.



Rotor Transmission

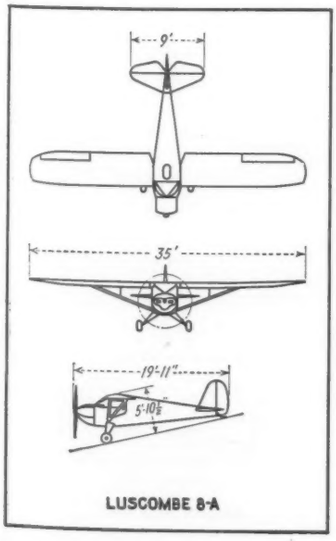
A. T. C. No. 712

KELLETT AUTOGIRO Model KD-1B

PERFORMANCE: High speed 127 m.p.h., cruising speed 102 m.p.h., climb 1,060 ft. per min., service ceiling 14,000 ft., no stalling speed.

STANDARD EQUIPMENT: Contains the following: compass, air-speed, altimeter, rotor tachometer, engine tachometer, engine gage unit, thermocouple, ammeter, clock.

(For further specifications see table p. 105)



LUSCOMBE 8-A

SPECIFICATIONS: Span 35 ft., length overall 20 ft., height overall 5 ft. 10½ in., landing gear tread 76 in., wing loading 8.6 lb. per sq. ft., power loading 18.5 lb. per hp., weight empty 650, gross weight 1,200 lb. This model is powered by a Continental engine, total rated hp. 65 at sea level, fuel capacity 15 gallons, normal range 350 miles, fuel consumption at cruising speed 4.25 gallons per hour, diameter of propeller is 76 in., area of wing (including ailerons) 140.0 sq. ft., total ailerons 13.0 sq. ft., fin 4.9 sq. ft., rudder 5.65 sq. ft., stabilizer 13.0 sq. ft., total elevators 8.75 sq. ft. Seats two.

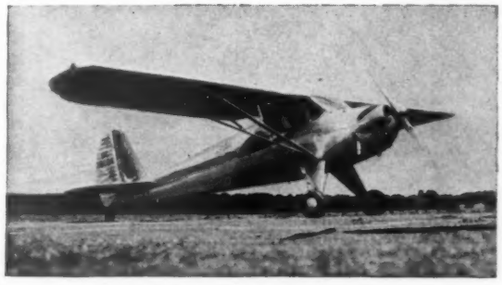
PERFORMANCE: High speed 115 m.p.h., at sea level, cruising speed 104 m.p.h. at sea level, stalling speed 37 m.p.h. Climb at sea level 900 ft. per minute, service ceiling 15,000 ft.

CONSTRUCTION MATERIAL: Spars of aluminum alloy, "I" section, ribs of aluminum alloy, fabric covering material, the landing gear is Oleo type, Firestone 16-6 tires, Shinn mechanical brakes, Alclad monocoque fuselage.

Landing Gear

STANDARD EQUIPMENT: Contains the following: airspeed, tachometer, altimeter, oil temperature gage, compass, (extra).

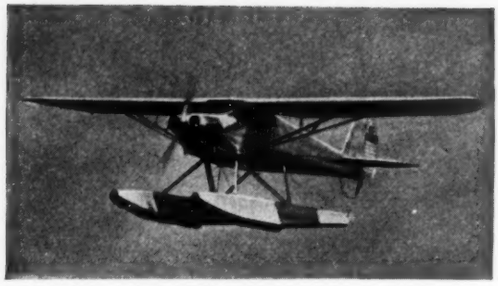
A. T. C. No. 694



LUSCOMBE Model 8-A

(For further specifications see table p. 105)

1 TO 3 SEATS



LUSCOMBE Model 8-A Seaplane

SPECIFICATIONS: Span 35 ft., overall length 21 ft. 4 in., overall height 8 ft., wing loading 9.0 lb. per sq. ft., power loading 19.4 lb. per hp., weight empty 791, gross weight 1,260 lb., this model is powered by a Continental engine, total rated hp. 65 at sea level, fuel capacity 15 gallons, normal range 350 miles, diameter of propeller 76 in., area of wing (including ailerons) 140.0 sq. ft., total ailerons area 13.0 sq. ft., fin 4.9 sq. ft., rudder area 5.65 sq. ft., stabilizer area 13.0 sq. ft., total elevators area 8.75 sq. ft.

PERFORMANCE: High speed 102 m.p.h. at sea level, cruising speed 95 m.p.h. at sea level, stalling speed 40 m.p.h., climb at sea level 650 ft. per minute, service ceiling 10,000 ft. Seats 2.

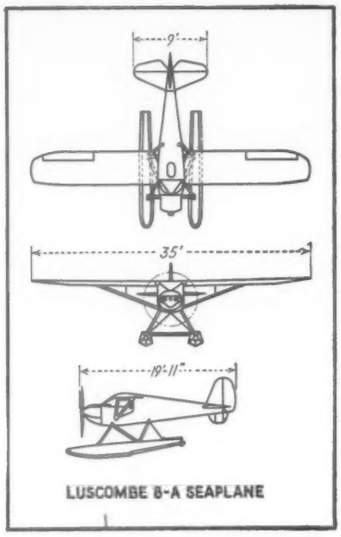
CONSTRUCTION MATERIAL: Spars are of aluminum alloy. "I" section, aluminum alloy ribs, fabric covering material, fuselage Alclad monocoque.

STANDARD EQUIPMENT: Contains the following: airspeed tachometer, altimeter, oil temperature gage, compass, (extra).

Engine Mount

(For further specifications see table pg. 105)

A. T. C. No. 694



LUSCOMBE 8-A SEAPLANE

MONOCOUPE Model 90-A

SPECIFICATIONS: Span 32 ft., overall length 20 ft. 6 in., overall height 6 ft. 11 in., landing gear tread 87.5 in. Wing loading 12.2 lb. per sq. ft., power loading 17.9 lb. per hp., weight empty 973, gross weight 1,610 lb. Powered by a Lambert engine rated at 90 hp. at sea level. fuel capacity 28 gallons, normal range 600 miles, fuel consumption at cruising speed 4.8 gallons per hr., diameter of propeller 78 in., wing area (including ailerons) 132.2 sq. ft., total ailerons area 13.5 sq. ft., fin area 4.1 sq. ft., rudder area 5.8 sq. ft., stabilizer area 10.6 sq. ft., total elevators area 9.2 sq. ft. Seats 2.

PERFORMANCE: High speed 130 m.p.h., at sea level, cruising speed 110 m.p.h. at sea level, stalling speed 40 m.p.h., climb at sea level 900 ft. per minute, service ceiling 15,000 ft.

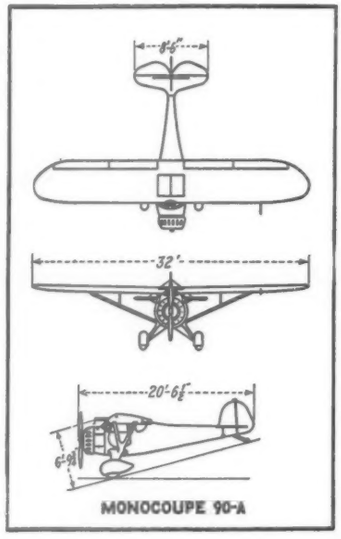
CONSTRUCTION MATERIAL: Spars are of solid spruce, wood ribs, fabric covering material, Ebert Hatch wheels, size 6.50 x 10, Ebert Hatch mechanical brakes, shock cord landing gear unit, fuselage of welded steel tubing with fabric covering.

STANDARD EQUIPMENT: This model is equipped with the following instruments; airspeed, altimeter, oil pressure, oil temperature; Airpath Institute compass; Airomarine tachometer.

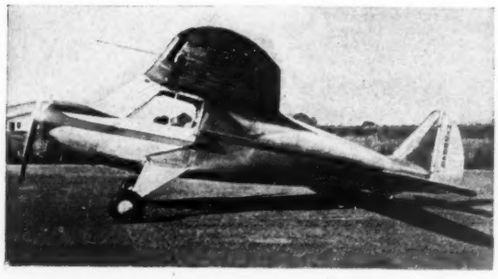
Steerable Tail Wheel

(For further specifications see table pg. 105)

A. T. C. No. 306



MONOCOUPE 90-A



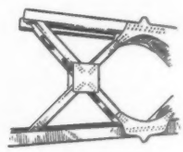
NAUGLE Model Mercury N-1

SPECIFICATIONS: Span 30 ft., overall length 21 ft. 8 in., overall height 6 ft. 8 in., the landing gear tread 84 in., wing loading 8.5 lb. per sq. ft., power loading 15.3 lb. per hp., empty weight 610, gross weight 1,150 lb. It is powered by a Lycoming engine, total rated hp. 75 at sea level, fuel capacity 15 gallons, normal range 450 miles, fuel consumption at cruising speed 4.6 gallons per hr., diameter of propeller 72 in., wing area (including ailerons) 135 sq. ft., total ailerons area 14 sq. ft., fin area 5.1 sq. ft., rudder area 6.8 sq. ft., stabilizer area 13.5 sq. ft., total elevators area 8.8 sq. ft. Seats two.

PERFORMANCE: High speed 145 m.p.h., at sea level, cruising speed 130 m.p.h., at sea level, stalling speed 45, climb at sea level 1,200 ft. per minute, service ceiling 20,000 ft.

CONSTRUCTION MATERIAL: Alclad wing spars, aluminum alloy ribs, fabric covering material, fixed landing gear, Shinn hydraulic brakes, shock cord unit, Firestone wheels 6.00 x 6, fuselage monocoque Aclad.

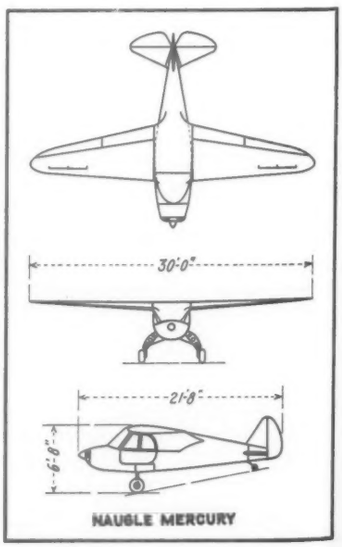
STANDARD EQUIPMENT: This model is equipped with the following instruments; air speed, sensitive altimeter, oil pressure, oil temperature gages, compass, tachometer.



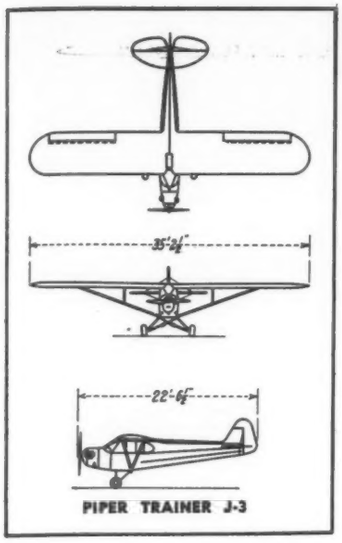
Wing Spar Construction

(For further specifications see table pg. 105)

No A. T. C.



NAUGLE MERCURY



PIPER TRAINER J-3

SPECIFICATIONS: Span 35 ft. 2½ in., length overall 22 ft. 5 in., height overall 6 ft. 8 in., landing gear tread 71 in. Wing loading 5.6 lb. per sq. ft., power loading 25 lb. per hp., weight empty 574 lb., gross weight 1,000 lb. It is powered by a Continental A-40 engine. Total rated hp. 40 at sea level, fuel capacity 9 gal., normal range 200 mi., fuel consumption at cruising speed 3 gal. per hr., propeller diameter 69 in. Wing area (including ailerons) 178.5 sq. ft., aileron area (total) 19.2 sq. ft., fin area 4.02 sq. ft., rudder area 6.55 sq. ft., stabilizer 14.65 sq. ft., total elevator area 10.64 sq. ft.

PERFORMANCE: High speed 85 m.p.h. at sea level, cruising speed 70 m.p.h. at sea level, stalling speed 38 m.p.h., climb at sea level 400 ft. per min., service ceiling 10,000 ft. Seats 2.

CONSTRUCTION MATERIAL: Wings have solid spruce spars, aluminum alloy ribs, fabric covering. Fixed landing gear. Hayes wheel 8.00 x 4, Rusco landing gear shock unit, skid tail unit, welded steel tubing with fabric covered fuselage.

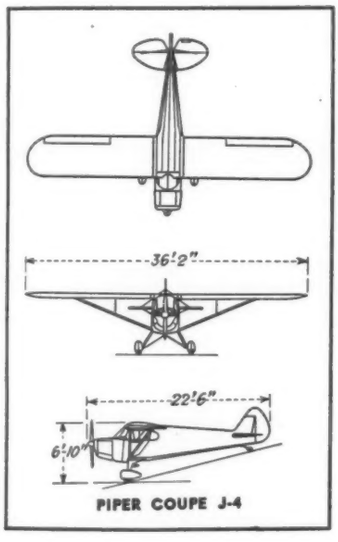
STANDARD EQUIPMENT: Instruments: Aeromarine airspeed, Aeromarine altimeter, Waltham

A. T. C. No. 660

PIPER Model J-3 Trainer

tachometer, U. S. Gauge Co. oil pressure, U. S. Gauge Co. oil temperature, Goodrich tires, Sensenich propeller, Rusco shock cord. This model is powered also by either Franklin or Lycoming 50 hp., or Continental 50, 60 and 75 hp. engines.

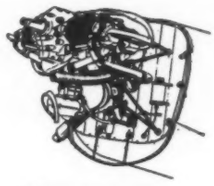
(For further specifications see table pg. 105)



PIPER COUPE J-4

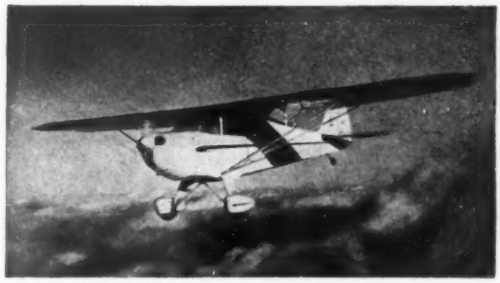
SPECIFICATIONS: The span is 36 ft. 2 in., overall length 22 ft. 6 in., overall height 6 ft. 10 in., the landing gear tread 77 in., wing loading 7.1 lb. per sq. ft., power loading 20.0 lb. per hp., empty weight 800, gross weight 1,301 lb. This model is powered by a Lycoming 0-145 engine, rated hp. 65 at sea level, fuel capacity 16 gallons, normal range 382 miles, fuel consumption at cruising speed 4.0 gallons per hr., diameter of propeller 70 in., area of wing (including ailerons) is 183.0 sq. ft., total ailerons 19.2 sq. ft., fin 4.66 sq. ft., rudder 6.76 sq. ft., stabilizer 14.66 sq. ft., total elevators 10.64 sq. ft. Seats 2.

PERFORMANCE: High speed 100 m.p.h., at sea level, cruising speed 87 m.p.h. at sea level.



Exhaust System and Engine Mount

A. T. C. No. 721

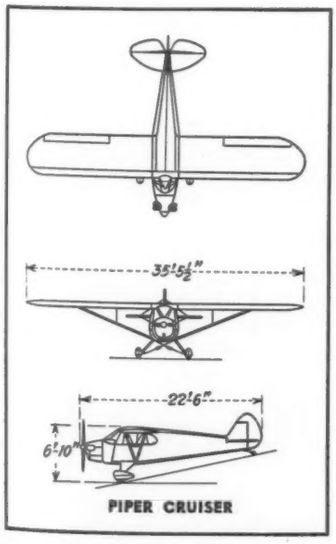


PIPER Model J-4 Coupe

Stalling speed 41 m.p.h., climb at sea level 600 ft. per minute, service ceiling 12,000 ft.

CONSTRUCTION MATERIAL: Solid spruce spars, aluminum alloy ribs, fabric covering material, fixed type landing gear, Hayes 8.00 x 4, Palmer hydraulic brakes, Oleo landing gear shock unit, fuselage steel tubing welded with fabric covering.

(For further specifications see table pg. 105)



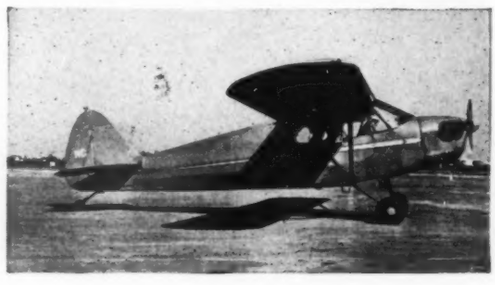
PIPER CRUISER

SPECIFICATIONS: Span 35 ft. 5½ in., overall length 22 ft. 6 in., overall height 6 ft. 10 in., landing gear tread 74½ in., wing loading 8.1 lb. per sq. ft., power loading 19.4 lb. per hp., empty weight 750, gross weight 1,450 lb., powered by an A-75 Continental or Lycoming geared 0-145 engine, total rated hp. 75, at sea level, fuel capacity 18 gallons, normal range 320 miles, fuel consumption at cruising speed 4.6 gallons per hour. Diameter of propeller 72 in., with Continental model; area of wing (including ailerons) 179 sq. ft., total aileron area 19.2 sq. ft., fin area 4.02 sq. ft., rudder area 6.76 sq. ft., stabilizer area 14.65 sq. ft., total elevator area 10.64 sq. ft. Seats 3.

PERFORMANCE: High speed 100 m.p.h. at sea level, cruising speed 87 m.p.h. at sea level, stalling speed 42 m.p.h., climb at sea level 450 ft. per minute, service ceiling 10,000 ft. Continental powered.

CONSTRUCTION MATERIAL: Solid spruce wing spars, aluminum alloy ribs, fabric covering material, fixed type of landing gear, Hayes wheel, size 8.00 x 4, Palmer hydraulic brakes, Rusco landing gear shock unit; fuselage constructed of welded steel tubing, fabric covering.

A. T. C. No. 725



PIPER Model J-5 Cruiser

STANDARD EQUIPMENT: Aeromarine airspeed. Aeromarine altimeter, U. S. Gauge Co. oil pressure and oil temperature instruments. Airpath Institute Co. compass, Waltham tachometer, Cub and Goodrich tires, hydraulic brakes.

(For further specifications see table pg. 105)

1 TO 3 SEATS

PITCAIRN Model PA-36

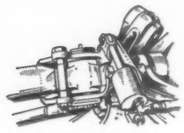
SPECIFICATIONS: Span 43 ft., overall length 20 ft. 5 in., overall height 10 ft. 3½ in., landing gear tread 84 in., wing loading 142 lb. per sq. ft., power loading 11.7 lb. per hp. weight empty 1,425, gross weight 2,050 lb., this model is powered by a Warner engine with total rated hp., 175 at sea level, fuel capacity 36 gallons, normal range 375 miles, fuel consumption at cruising 10 gallons per hour, diameter of propeller 92 in., area of rotor disc is 1,452 sq. ft., fin 24.4 sq. ft., rudder 5.2 sq. ft., stabilizer 12.4 sq. ft., total elevators 5.4 sq. ft. Seats two.

PERFORMANCE: High speed 121.7 m.p.h. at sea level, cruising speed 102 m.p.h. at sea level, stalling speed 0.0 m.p.h., climb at sea level 805 ft. per minute, service ceiling 15,000 ft.

CONSTRUCTION MATERIAL: Steel tubing spars, plywood ribs, plywood covering material, Oleo type landing gear, Bendix wheel 20 x 4, Bendix hydraulic brakes, Bendix Oleo landing gear shock unit and tail unit.

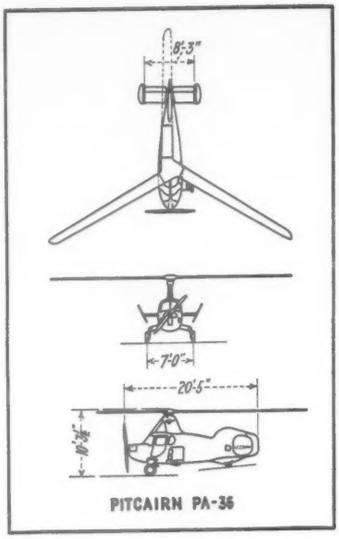
STANDARD EQUIPMENT: This model contains the following equipment; engine tachometer, oil temperature and pressure gages, airspeed indicator, altimeter, compass, electric rotor tachometer.

(For further specifications see table p. 105)



Rotor Blade Hub

No A. T. C.



PITCAIRN PA-36

PORTERFIELD Model LP-65

SPECIFICATIONS: Span 34 ft. 9 in., overall length 22 ft. 7 11/16 in., overall height 7 ft., landing gear tread 69 in., wing loading 6.9 lb. per sq. ft., power loading 17.9 lb. per hp., weight empty 675, gross weight 1,160 lb., this model is powered by a Lycoming engine, total rated hp. 65, at sea level, fuel capacity 13.5 gallons, normal range 290 miles, fuel consumption at cruising speed 4.5 gallons per hr., diameter of propeller 69 in., wing (including ailerons) 168.8 sq. ft., total ailerons 19.1 sq. ft., fin 6.38 sq. ft., rudder 6.84 sq. ft., stabilizer 10.57 sq. ft., total elevators 11 sq. ft. Seats two.

PERFORMANCE: High speed 109 m.p.h., cruising speed 98 m.p.h., stalling speed 33 m.p.h., climb 560 ft. per min., service ceiling 15,000 ft.

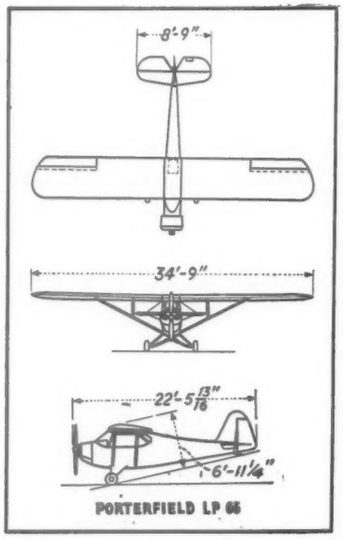
CONSTRUCTION MATERIAL: Spruce wing spars, spruce ribs, fabric covering material, Shinn wheel 6.00-6, mechanical Shinn brakes, welded steel tubing fuselage with fabric covering.

STANDARD EQUIPMENT: Steerable tail wheel, dual controls, tachometer, altimeter, airspeed, oil temperature, pressure gages, outside oil drain, outside fuel drain, dual fuel shutoff.

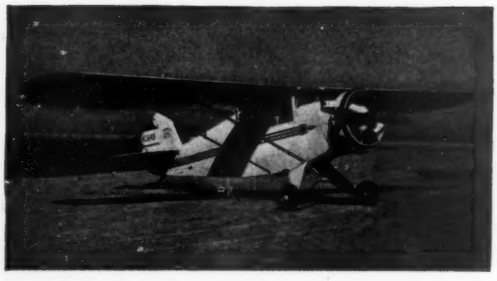
(For further specifications see table p. 105)

Landing Gear Bracing

A. T. C. No. 720



PORTERFIELD LP 65



PORTERFIELD Model 90

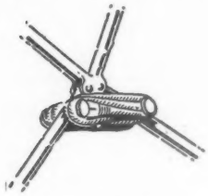
SPECIFICATIONS: Span 32 ft., overall length 20 ft. 3 in., overall height 6 ft. 8¾ in., landing gear tread 69.5 in., wing loading 9.0 lb. per sq. ft., power loading 14.7 lb. per hp., weight empty 826 lb., gross weight 1,326 lb., powered by a Warner engine, with total rated hp. 90 at sea level, fuel capacity 18 gallons, normal range 330 miles, fuel consumption at cruising speed 6.5 gallons per hour, diameter of propeller 80 in., wing area (including ailerons) 147 sq. ft., total ailerons 17.16 sq. ft., fin 5.16 sq. ft., rudder 6.33 sq. ft., stabilizer 13.2 sq. ft., total elevators 9.55 sq. ft. Seats two.

PERFORMANCE: High speed 133 m.p.h., at sea level, cruising speed 120 m.p.h., at sea level, stalling speed 40 m.p.h., climb at sea level 1050 ft. per minute, service ceiling 20,000 ft.

CONSTRUCTION MATERIAL: Spruce wing spars, spruce ribs, fabric covering material, Shinn wheel 6.00-6, mechanical Shinn brakes, welded steel tubing, fabric fuselage.

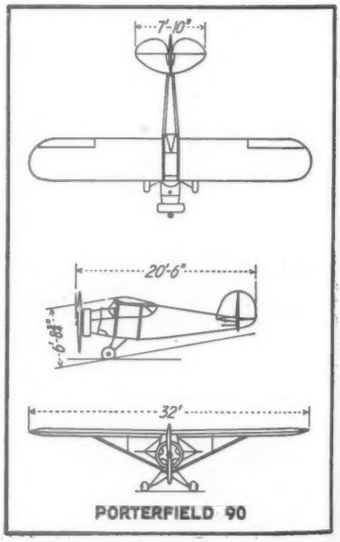
STANDARD EQUIPMENT: Airspeed indicator, oil temperature, oil pressure gages, tachometer, altimeter, compass, dual brakes, navigation lights, steerable tail wheel, shock covers.

(For further specifications table p. 105)

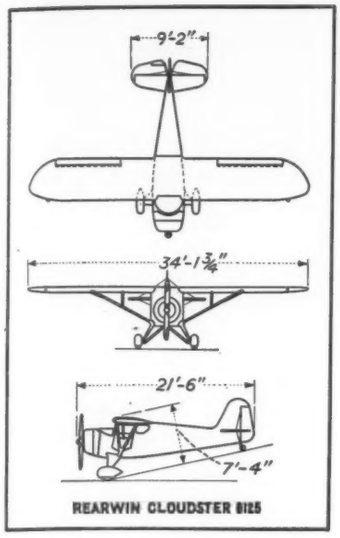


Shock Absorber

A. T. C. No. 611



PORTERFIELD 90



REARWIN CLOUDSTER 8125

SPECIFICATIONS: Span 34 ft. 1¾ in., overall length 21 ft. 6 in., overall height 7 ft. 4 in., landing gear tread 80 in., wing loading 10.73 lb. per sq. ft., power loading 14.45 lb. per hp., weight empty 1,070, gross weight 1,734 lb. This model is powered by a Ken Royce engine, total rated hp. 120 at sea level, fuel capacity 34 gallons, normal range 625 miles, fuel consumption at cruising speed 7 gallons per hour, area of wing (including ailerons) 161.8 sq. ft., total ailerons 13.13 sq. ft., fin 8.45 sq. ft., rudder 5.75 sq. ft., stabilizer 13.94 sq. ft., total elevators 11.56 sq. ft. Seats two.

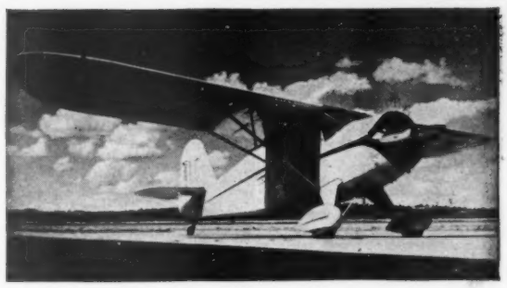
PERFORMANCE: High speed 145 m.p.h., at an altitude of 800 ft., cruising speed 125 m.p.h. at an altitude of 800 ft., stalling speed 48 m.p.h., climb at sea level 1,000 ft. per minute, service ceiling 17,000 ft.

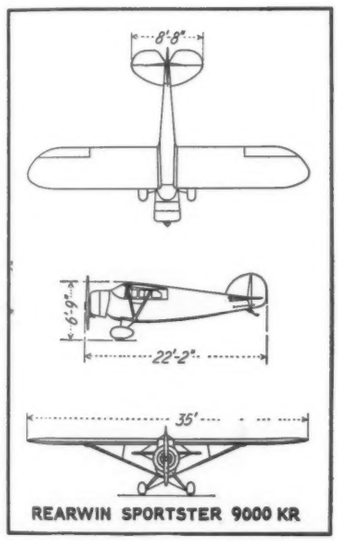
CONSTRUCTION MATERIAL: Wing spars are of solid spruce, spruce ribs, fabric covering material, landing gear is of fixed type, Goodyear wheels 18 x 8-3, Goodyear mechanical brakes, hydraulic landing gear shock unit, wheel tail unit, fuselage is of welded steel tubing, fabric covered.

STANDARD EQUIPMENT: This model contains the following instruments; tachometer, airspeed, oil pressure, oil temperature gages, altimeter, compass, switch.

(For further specifications see table p. 105)

A. T. C. No. 711

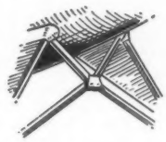

REARWIN Model Cloudster-8125



REARWIN SPORTSTER 9000 KR

SPECIFICATIONS: Span 35 ft., overall length 22 ft. 3 in., overall height ft. 9 in., landing gear tread 72 in., wing loading 8.8 lb. per sq. ft., power loading 16.2 lb. per hp., empty weight 830, gross weight 1,460, this model is powered by a Ken Royce engine, total rated hp. 90, at sea level, fuel capacity 24 gallons, normal range 500 miles, fuel consumption at cruising speed 5.0 gallons per hour, diameter of propeller 76 in., area of wing (including ailerons) is 166 sq. ft., total ailerons 19.75 sq. ft., fin 5.17 sq. ft., rudder 6.92 sq. ft., stabilizer 15.04 sq. ft., total elevators 12.12 sq. ft. Seats two.

PERFORMANCE: The high speed is 125 m.p.h. at an altitude of 800 ft., cruising speed 112 m.p.h. at an altitude of 800 ft., stalling speed 38 m.p.h., climb at sea level 1,000 ft. per minute, service ceiling 15,000 ft.

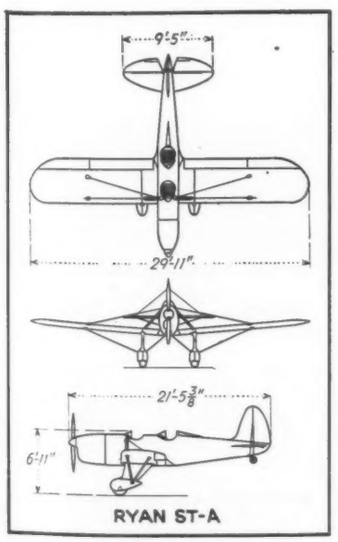

Landing Gear Bracing

CONSTRUCTION MATERIAL: Wings spars are of solid spruce, spruce ribs, fabric covering material, landing gear is of fixed type. Goodyear wheel 18 x 8-3, Goodyear mechanical brakes, hydraulic landing gear shock unit, wheel tail unit, fuselage of welded steel tubing, fabric covered.

(For further specifications see table p. 105)

A. T. C. No. 591

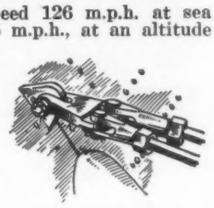
REARWIN Model Sportster 9000KR



RYAN ST-A

SPECIFICATIONS: Span 29 ft. 11 in., overall length 21 ft. 5⅜ in., overall height 6 ft. 11 in., landing gear tread 66 in., wing loading 12.9 lb. per sq. ft., power loading 12.8 lb. per hp., weight empty 1,081, gross weight 1,600 lb., this model is powered by a Menasco engine, total rated hp. 125 at sea level, fuel capacity 24 gallons normal range 366 miles, fuel consumption at cruising speed 8.0 gallons per hour, diameter of propeller 80 in., area of wing (including ailerons) 124.0 sq. ft., total ailerons 12 sq. ft., fin 4.7 sq. ft., rudder 7.2 sq. ft., stabilizer 12 sq. ft., total elevators 10 sq. ft.

PERFORMANCE: High speed 126 m.p.h. at sea level, cruising speed 115 m.p.h., at an altitude of 3,000 ft., stalling speed 54 m.p.h., climb at sea level 800 ft. per minute, service ceiling 16,000 ft. Seats two.

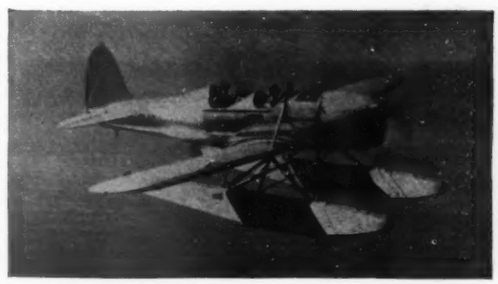

Guy Wire Fitting

CONSTRUCTION MATERIAL: Solid spruce wing spars, aluminum alloy ribs, fabric covering material, fixed type landing gear, Goodyear wheels 18 x 8-3, Goodyear mechanical brakes, Oleo landing gear shock unit, wheel tail unit, aluminum alloy monocoque fuselage.

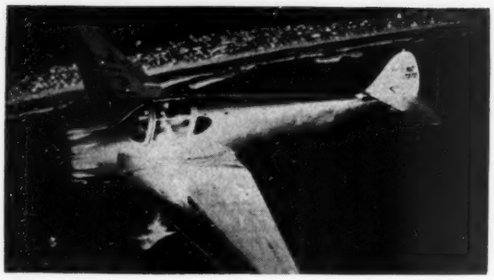
STANDARD EQUIPMENT: Altimeter compass, tachometer, air-speed, oil pressure, oil temperature gages, fuel gage. Available as a land or seaplane—see photo and 3-view.

(For further specifications see table p. 105)

A. T. C. No. 571


RYAN AERONAUTICAL Model ST-A

1 TO 3 SEATS



RYAN Model No. S-C

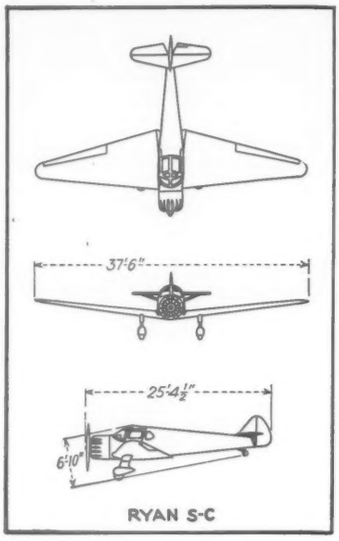
SPECIFICATIONS: Span 37 ft. 6 in., overall length 25 ft. 4½ in., landing gear tread 96¾ in. Wing loading 10.7 lb. per sq. ft., power loading 14.8 lb. per hp., weight empty 1,345 lb., gross weight 2,150 lb. It is powered by a Warner engine. Total rated hp. 145 at S. L. Fuel capacity 37 gal., normal range 525 miles, fuel consumption at cruising speed 9.5 gal. per hr. Propeller diameter is 82 in., wing area (including ailerons) 202 sq. ft., ailerons (total) 16.2 sq. ft., fin 5.1 sq. ft., rudder 6.6 sq. ft., stabilizer 14.3 sq. ft., total elevators 11.3 sq. ft.

PERFORMANCE: High speed 150 m.p.h. at sea level, cruising speed 135 m.p.h. at 8,500 ft., stalling speed 45 m.p.h. Climbs at sea level 900 ft. per min. Service ceiling 17,200 ft.

CONSTRUCTION MATERIAL: Wings have steel spars, aluminum alloy ribs, Alclad and fabric covering material. Fixed type landing gear, Goodyear 18 x 8-3 wheel, Goodyear mechanical brakes, Oleo landing gear and shock unit, wheel tail unit, aluminum alloy monocoque fuselage. Plexiglas is used for cockpit enclosures, landlight covers, and similar transparent sections. Seating capacity two.

(For further specifications see table p. 105)

A. T. C. No. 658



RYAN S-C

ST. LOUIS AIRCRAFT Model PT-1

SPECIFICATIONS: Span 33 ft. 10 in., overall length 26 ft. 5 in., overall height 9 ft. 5 in., wing loading 9.4 lb. per sq. ft., power loading 12.3 lb. per h.p., weight empty 2,055, gross weight 2,770 lb. Powered by a Wright engine, with a rating of 225 hp. at sea level, fuel capacity 42 gallons, normal range 350 miles, fuel consumption at cruising speed of 13.9 gallons per hour, wing area (including ailerons) 297 sq. ft. Seats two.

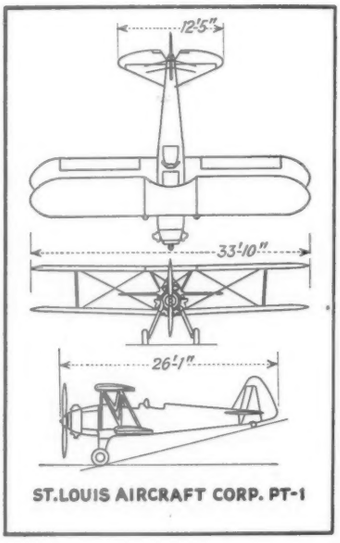
PERFORMANCE: It has a high speed of 130 m.p.h., at sea level; and a cruising speed of 116 m.p.h., at sea level; stalling speed of 53 m.p.h., climb at sea level 880 feet per minute, service ceiling 15,000 feet.

CONSTRUCTION MATERIAL: The wings are made of aluminum alloy spars, aluminum alloy tubing ribs and fabric covering. The fuselage is of monocoque type. Streamline landing gear wheels, size 24 in., Bendix-hydraulic brakes, Aerol shock unit, and Aerol tail unit.

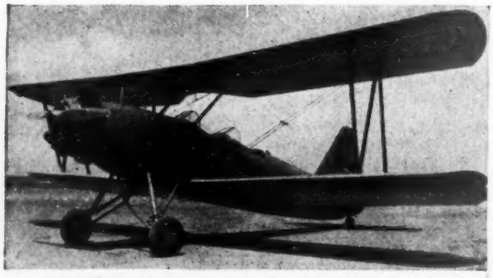
STANDARD EQUIPMENT includes the following instruments: 2 Elgin clocks, 2 Pioneer altimeters, 2 Jaeger tachometer, 2 Cons. engine gauge, 1 Pioneer rate-of-climb, 1 Pioneer compass, 1 Pioneer bank-and-turn; accessories include Lord instrument shock mountings, General tires, Bendix brakes, Hamilton Standard propeller, Bendix seats, push-pull controls, ball bearings, Aerol shock strut.

(For further specifications see table p. 105)

No A. T. C.



ST.LOUIS AIRCRAFT CORP. PT-1

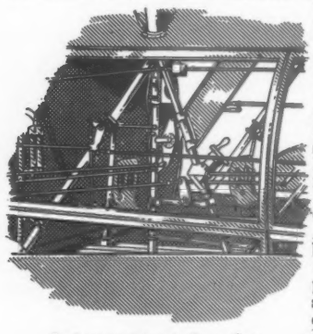


SOUTHERN AIRCRAFT BM-10A

SPECIFICATIONS: Span 34 ft. 1 in., overall length 25 ft. 2 in., height overall 9 ft. 6 in., 90.16 in. landing gear tread; wing loading 9.16 lb. per sq. ft., power loading 12.4 lb. per hp., weight empty, 2,070 lb., gross weight, 2,790 lb. The Lycoming engine is rated at 225 hp., the fuel capacity is 42 gallons, normal range is 355 miles, diameter of the propeller is 102 in., Seats two.

PERFORMANCE: High speed 123 m.p.h., cruising speed 105 m.p.h., stalling speed 50 m.p.h., climb at sea level 850 ft. per minute, service ceiling 15,000 ft.

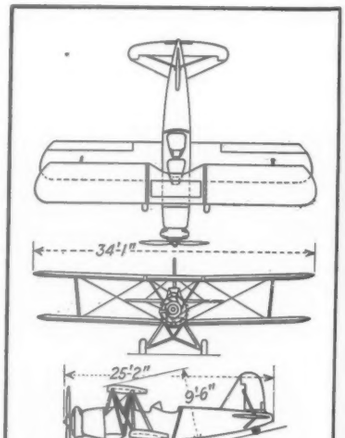
STANDARD EQUIPMENT includes air speed indicator, altimeter, tachometer, ignition switch, oil pressure gage, oil thermometers, compass, clock; accessories include Lord instrument shock mountings, General tires, Air Associates brakes, Curtiss Reed propeller, Bendix seats, Southern controls, Fafnir bearings, Cleveland or Bendix shock strut, Pyle Nat. lights, etc.



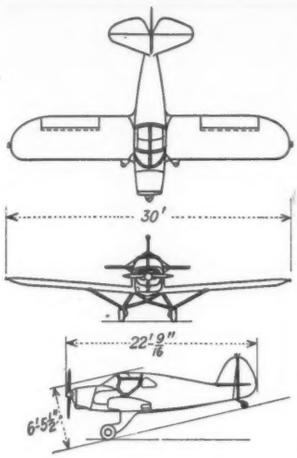
Cabane Strut Bracing

(For further specifications see table p. 105)

No A. T. C.



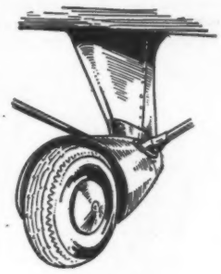
SOUTHERN AIRCRAFT BM-10A



STEARMAN JENSEN A

SPECIFICATIONS: Span 30 ft., overall length 22 ft. 9/16 in., height overall 6 ft. 5½ in., landing gear tread 67 in., wing loading 8.68 lb. per sq. ft., power loading 17.63 lb. per hp., weight empty 618 lb., gross weight 1,146 lb. The Lycoming engine is rated at 65 hp. at sea level; fuel capacity 20 gallons, normal range 450 miles, fuel consumption 4.7 gallons per hour, diameter of the propeller is 70 in. Area of wing (including ailerons) 132 sq. ft., total ailerons 14.58 sq. ft., fin 4.82 sq. ft., rudder 6.27 sq. ft., stabilizer 11.94 sq. ft., total elevators 11.22 sq. ft.

PERFORMANCE: High speed 115 m.p.h. at sea level, cruising speed 105 m.p.h. at sea level, stalling speed 45 m.p.h. at sea level, climb at sea level 750 ft. per minute, service ceiling 14,000 ft.



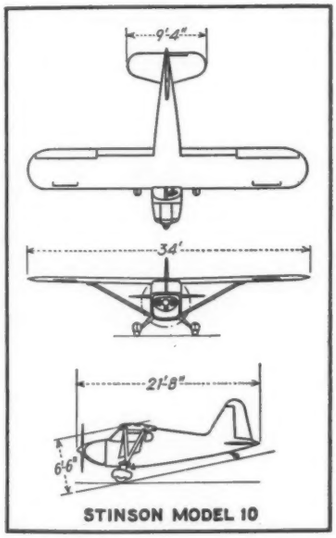
Landing Gear

No A. T. C.

STEARMAN JENSEN A

STANDARD EQUIPMENT includes following instruments: U. S. Gage Altimeter, U. S. Air Speed, Stewart Warner engine gage unit, Basco ignition switch; accessories include shock mountings, Firestone tires, Wheel Brakes, Freedman Burnham propeller, stick controls, Fafnir controls bearings, Grimes lights, wheel pants, tail wheel, etc. Seats two.

(For further specifications see table p. 105)



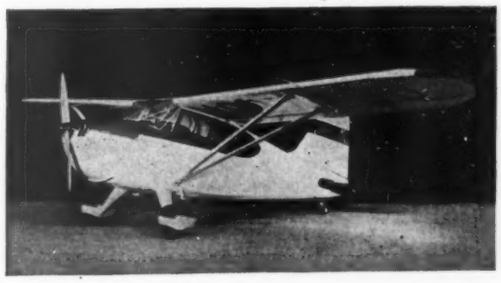
STINSON MODEL 10

SPECIFICATIONS: Span 34 ft., overall length 21 ft. 8 in., overall height 6 ft. 6 in., landing gear tread 84 in., wing loading 10.5 lb. per sq. ft., power loading 18 lb. per hp., weight empty 1,018, gross weight 1,625 lb. Has Franklin engine with a rating of 90 hp. at sea level, fuel capacity 20 gallons per hour, diameter of propeller 72 in.

PERFORMANCE: High speed 115 miles per hour at sea level, cruising speed 110 miles per hour at sea level, stalling speed 43.5 miles per hour, climb at sea level 600 ft. per minute, service ceiling 14,000 ft.

CONSTRUCTION MATERIAL: Wing spars are of solid spruce, wing covered with fabric, wheel size is Hayes 6.00 x 6, Goodrich hydraulic brakes, Oleo-spring landing gear shock unit, wheel tail unit, welded steel tubing fuselage, fabric covered the weight empty of the Standard model is 954 lb.; the landing gear is of fixed type, 84 in. tread, wheel size is Hayes 6 x 6, Goodrich hydraulic brakes, landing gear shock unit is Oleo-spring, fuselage is welded steel tubing with fabric covering.

No A. T. C.



STINSON Model Super-Deluxe

STANDARD EQUIPMENT: Includes for Super-Deluxe the following: dual magneto, navigation lights, hydraulic brakes, parking brakes, compass, steerable tail wheel, engine driven generator, sound proofing, springdraulic shock absorbers.

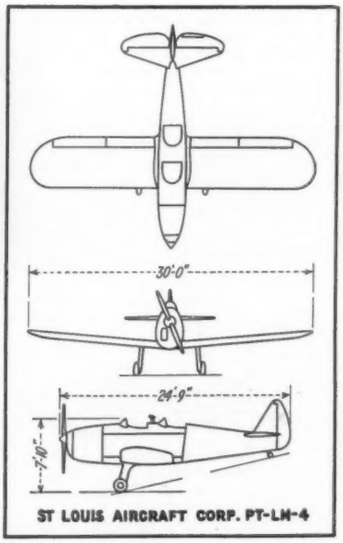
(For further specifications see table p. 105)

ST. LOUIS AIRCRAFT PT-LM-4 No A. T. C.

SPECIFICATIONS: It is equipped with a Ranger engine, rated at 180 hp. at sea level.

PERFORMANCE: High speed 137 m.p.h., cruising speed 125 m.p.h. both at sea level.

STANDARD EQUIPMENT: Includes Aeromarine clocks, altimeters, tachometers, engine gage, rate-of-climb, compass and Pioneer bank-and-turn instruments. General tires and brakes, Sensenich propeller, Bendix seats, push-pull controls, ball bearings, Oleo shock strut. Seats 2.



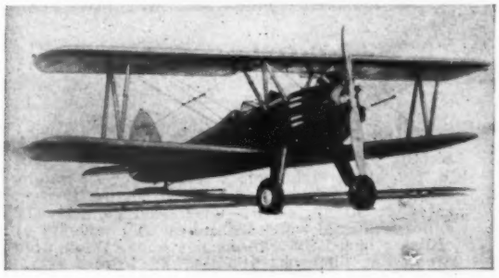
ST LOUIS AIRCRAFT CORP. PT-LM-4

WHITE Model PT-7 No A. T. C.

SPECIFICATIONS: Span 31 ft., overall length 24 ft., 5¾ in., overall height 8 ft. 9 in., wing loading 9.27 lb. per sq. ft., power loading 13.6 lb. per hp., gross weight 2,243 lb. powered by a Warner or Kinner, fuel capacity 36 gallons, normal range 332.5 miles, wing area (including ailerons) 242.5 sq. ft., total ailerons 27.6 sq. ft.

PERFORMANCE: High speed 115 m.p.h., cruising speed 95 m.p.h., stalling speed 40 m.p.h., climb at sea level 1,000 ft. per minute.

(For further specifications see table p. 105)



1 to 3 SEATS

SUMMIT AERONAUTICAL CORP. Model HM-5

SPECIFICATIONS: Span 27 ft., overall length 22 ft., overall height 7 ft. 4 in., landing gear tread 80 in., wing loading 11.25 lb. per sq. ft., power loading 18 lb. per hp., weight empty 825 lb., gross weight 1,350 lb. The Continental engine is rated at 75 hp., at sea level, its fuel capacity is 18 gallons, it has a normal range of 480 miles, fuel consumption at cruising speed is 4.7 gallons per hour, the diameter of the propeller is 70 in., area of the wing (including ailerons) is 120 sq. ft., total ailerons—10 sq. ft., fin 5.5 sq. ft., rudder 7.6 sq. ft., stabilizer 12.1 sq. ft., total elevators 8.1 sq. ft. Seats two.

PERFORMANCE: High speed of 137 m.p.h., at sea level; cruising speed of 125 m.p.h., at sea level; stalling speed 42 m.p.h., climb at sea level 800 ft. per minute, service ceiling 16,000 ft.

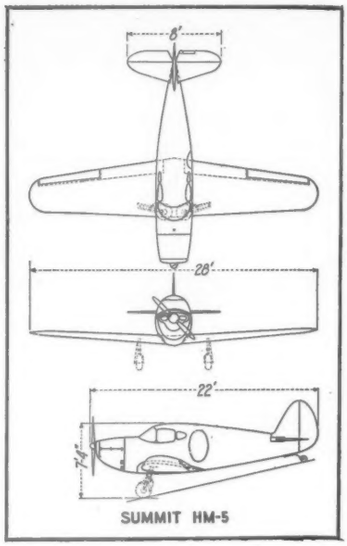
CONSTRUCTION MATERIAL: Plastic spruce wing spars, plywood ribs, plywood covering.

STANDARD EQUIPMENT, Instruments: U. S. Gage air speed, U. S. Gage altimeter, Stewart-Warner tachometer, Stewart-Warner oil pressure gage Stewart - Warner oil temperature gage Bendix Scintilla magneto switch; accessories: Firestone tires, Hayes brakes, Freedman, Burnham propeller, Fafnir bearings.

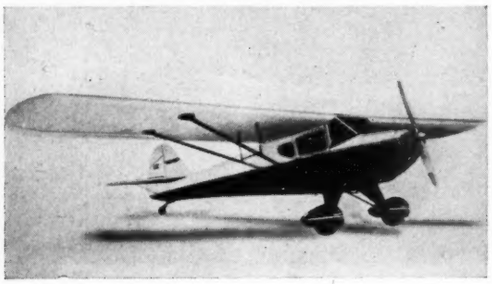
(For further specifications see table pg. 105)

Window Installation

No A. T. C.



SUMMIT HM-5



TAYLORCRAFT Model BC 12-65

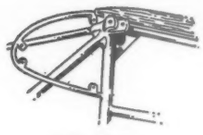
SPECIFICATIONS: Span 36 ft., length overall 22 ft., height overall 6 ft. 10 in., wing loading 7.1 lb. per sq. ft., power loading 18.4 lb. per hp., weight empty 700 lb., gross weight 1200 lb. It is powered by a Continental engine, rated at 65 hp. at sea level, fuel capacity 18 gallons, normal range 375 miles, fuel consumption at cruising speed 4 gallons per hour. The propeller measures 72 inches in diameter. The wing area (including ailerons) is 169 sq. ft. Seats two.

PERFORMANCE: High speed 105 m.p.h. at sea level, cruising speed 95 m.p.h. at sea level, stalling speed 38 m.p.h., climb at sea level 600 ft. per minute, service ceiling 15,000 ft.

CONSTRUCTION MATERIAL: Wing spars are of solid spruce, metal ribs fabric covering. Welded steel tubing, fabric covered fuselage. Wheel tail unit.

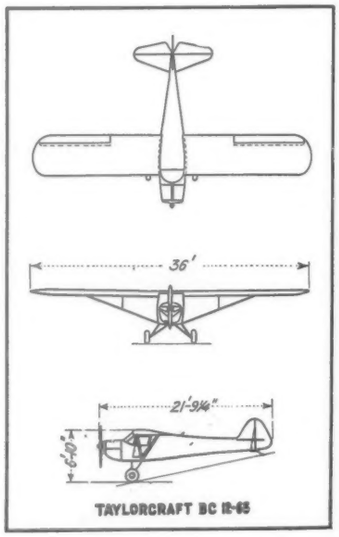
STANDARD EQUIPMENT: Dual ignition engine, wooden propeller, Shinn Wheels with Brakes, Taylorcraft compass, full swivel tail wheel, parking brake; air speed indicator, altimeter, oil temperature gage, oil pressure gage, tachometer.

(For further specifications see table pg. 105)



Wing Fitting

A. T. C. No. 696



TAYLORCRAFT BC 12-65

TAYLORCRAFT Model BL-T Trainer

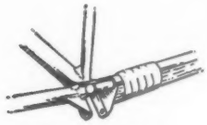
SPECIFICATIONS: Span 36 ft., overall length 22 ft., height overall 6 ft. 10 in., wing loading weight 6,8 lb. per sq. ft., power loading 23.0 lb. per hp., weight empty 632 lb., gross weight 1,150 lb. It is powered by a Lycoming engine, rated at 50 hp. at sea level, fuel capacity 12 gallons, normal range 270 miles, fuel capacity at cruising speed 3.5 gallons per hour. Wing area (including ailerons) 169.0 sq. ft.

PERFORMANCE: High speed 97 m.p.h. at sea level, cruising speed 88 m.p.h. at sea level, stalling speed 38 m.p.h. Climb at sea level 450 ft. per minute. Service ceiling 13,000. Seats two.

CONSTRUCTION MATERIAL: Wing spars are of solid spruce, metal ribs, fabric covering material, shock cord landing gear unit, skid tail unit. Welded steel tubing, fabric covered fuselage.

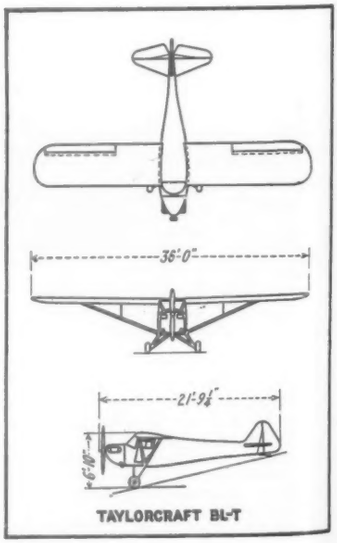
STANDARD EQUIPMENT: Single ignition engine, wooden propeller, Shinn wheels; tachometer, oil pressure and temperature gages, altimeter, air speed indicator. Optional equipment: cabin heater, dual ignition, navigation lights and battery, stick type control.

(For further specifications see table pg. 105)

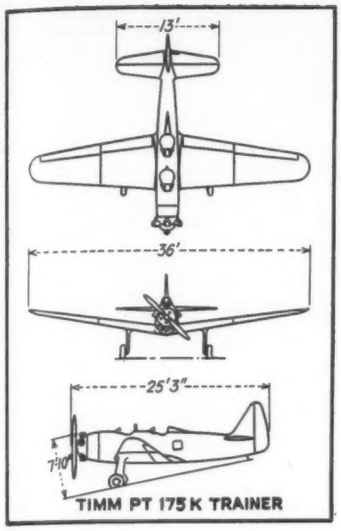


Rear Landing Gear Fitting

A. T. C. No. 700



TAYLORCRAFT BL-T



TIMM PT 175 K TRAINER

SPECIFICATIONS: Span, 36 ft., overall length 25 ft. 5½ in., height overall 10 ft. 6 in., landing gear tread 109¼ in.; wing loading 13.15 lb. per sq. ft., power loading 13.7 lb. per hp., weight empty 1700 lb., gross weight 2400 lb. It is powered by a Kinner engine rated at 175 hp. at sea level, fuel capacity 40 gallons, normal range 400 miles, fuel consumption at cruising speed 10 gallons per hour. The propeller measures 99 in. in diameter. Area of wing (including ailerons) 182.25 sq. ft., total ailerons 20.75 sq. ft., fin 12.1 sq. ft., rudder 9.35 sq. ft., stabilizer 24.66 sq. ft., total elevators 16.66 sq. ft. Seats two.

PERFORMANCE: High speed 145 m.p.h. at sea level, cruising speed 126 m.p.h., at sea level, stalling speed 50 m.p.h., climb at sea level 900 ft. per minute, service ceiling 17,500 ft.

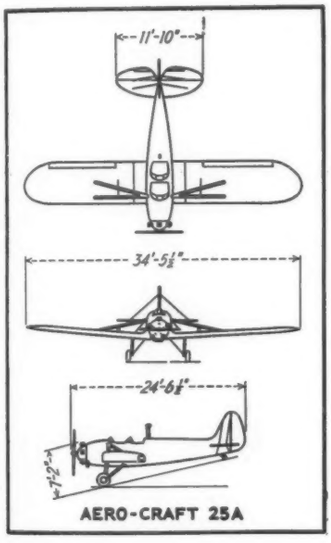
Landing Gear

No A. T. C.

TIMM AIRCRAFT Model No. PT 175K

CONSTRUCTION MATERIAL: The wing spars are boxed type, truss ribs covering material. The landing gear is of fixed type, Air Wheels 7.00-8, Shinn hydraulic brakes, Oleo boxed type shock unit, hydraulic tail unit, spruce wood fuselage.

(For further specifications see table p. 105)



AERO-CRAFT 25A

SPECIFICATIONS: Span 34 ft. 5.5 in., overall length 24 ft. 6.5 in., height overall 7 ft. 2.5 in., wing loading 10.9 lb. per sq. ft., power loading 13.5 lb. per hp., weight empty 1,302, gross weight 1,916 lb., powered by a Kinner engine, total rated 160 hp. at sea level, normal range 400 miles, wing area (including ailerons) 175 sq. ft. Seats two.

PERFORMANCE: High speed 125 m.p.h., at sea level, cruising speed 115 m.p.h. at sea level, stalling speed 45 m.p.h., climb at sea level 1,100 ft. per minute, service ceiling 17,950 ft.

CONSTRUCTION MATERIAL: Spars are of spruce, wood ribs, fabric covering material. Landing gear is of fixed type.

STANDARD EQUIPMENT: Kinner R5 Series 2 engine rated 160 hp. at 1,850 r.p.m. at S.L.,

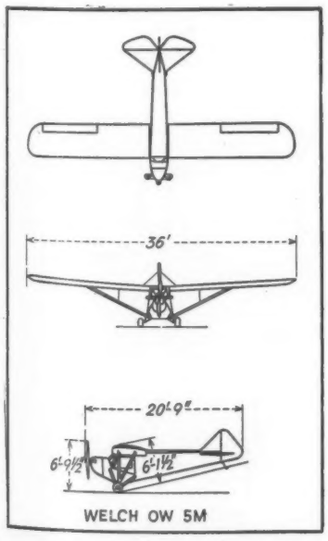
Wing Strut Bracing

A. T. C. No. 733

WALLY TIMM Model Aero-Craft

hydraulic brakes, dual controls, tachometer, altimeter, airspeed indicator, oil temperature gage, oil pressure gage, oil and spring shock struts, tail wheel (steerable and full swivel), 7.00 x 8 wheels and tires. Extra equipment: navigation lights, generator, engine cover, cockpit cover, compass, battery, starter.

(For further specifications see table p. 105)



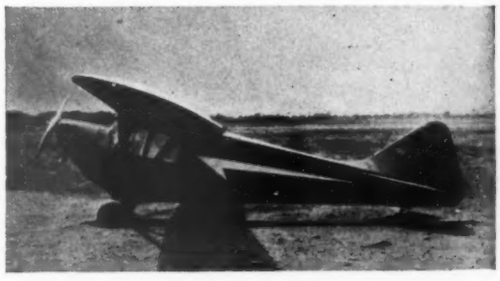
WELCH OW 5M

SPECIFICATIONS: Span 34 ft. 4 in., overall length 20 ft. 6 in., overall height 7 ft., landing gear tread 56½ in., wing loading 6.6 lb. per sq. ft., power loading 25.7 lb. per hp., weight empty 528, gross weight 950 lb., powered by a Continental engine, total rated horse power 40 at sea level, fuel capacity 9 gallons, normal range 250 miles, fuel consumption at cruising speed 3 gallons per hour, diameter of propeller 66 in., wing area (including ailerons) 138.0 sq. ft., total aileron area 18.92 sq. ft., fin area 11.2 sq. ft., rudder area 9.13 sq. ft., stabilizer area 14.4 sq. ft., total elevator area 11.2 sq. ft. Seats two.

PERFORMANCE: High speed 93 m.p.h. at sea level, cruising speed 85 m.p.h., at sea level, stalling speed 32 miles per hour, climb at sea level 460 feet per minute, service ceiling 12,000 ft.

Landing Gear

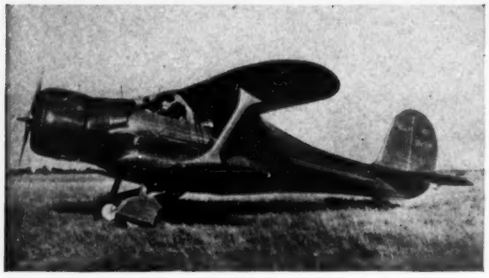
A. T. C. No. 637


WELCH Model OW-5M

CONSTRUCTION MATERIAL: Spruce wing spars, "I" section, basswood ribs, fabric covering material, fixed type landing gear, Welch wheel, size 16 x 7, solid landing gear shock unit, wheel tail unit, fuselage is constructed of welded steel tubing, fabric covered.

(For further specifications see table p. 105)

CIVIL AIRCRAFT 4 TO 5 SEATS



BEECH Model D 17 A

SPECIFICATIONS: Span 32 ft., overall length 26 ft. 7⅞ in., overall height 8 ft., landing gear tread 86 in., wing loading 14.17 lb. per sq. ft., power loading 13.1 lb. per hp., weight empty 2,517, gross weight 4,250 lb., powered by a Wright Whirlwind engine, total rated hp. 320, at sea level, fuel capacity 98 gallons, normal range 820 miles, fuel consumption at cruising speed 17 gallons per hour, diameter of propeller 99 in., wing area (including ailerons) 296.5 sq. ft., total aileron area 23.75 sq. ft., fin area 6.56 sq. ft., rudder area 8.7 sq. ft., stabilizer area 24.5 sq. ft., total elevator area 16.6 sq. ft.

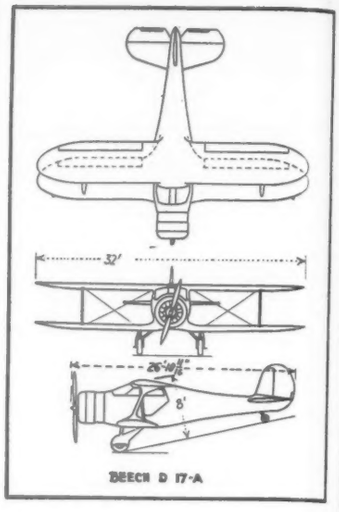
PERFORMANCE: High speed 178 m.p.h. at sea level, cruising speed 170 m.p.h. at an altitude of 9,600 ft., stalling speed 50 m.p.h., climb at sea level 1,100 ft. per minute, service ceiling 15,500 ft.

Landing Gear

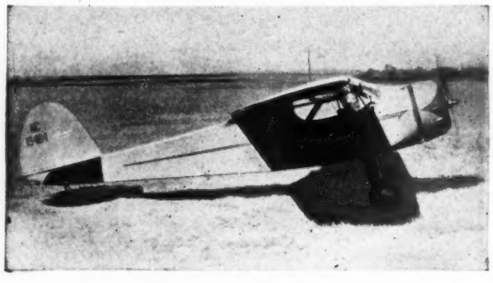
CONSTRUCTION MATERIAL: Solid spruce wing spars, spruce ribs, fabric covering, retractable type of landing gear, Goodyear wheel, size 7.50 x 10, hydraulic brakes, Oleo spring landing gear shock unit, welded steel tubing, fabric covered fuselage. Seats 5.

(For further specifications see table p. 109)

A. T. C. No. 713



BEECH D 17-A

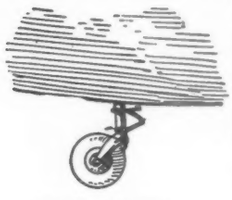


CESSNA Model C-145

SPECIFICATIONS: Span 34 ft. 2 in., overall length 24 ft. 8 in., overall height 7 ft., landing gear tread 87 in.; wing loading 13.5 lb. per sq. ft., power loading 16.9 lb. per h.p., weight empty, 1380 lb., gross weight 2450 lb. Powered by a Warner, with Lord mountings, with the rating of 145 h.p. at sea level, fuel capacity 35 gallons, normal range 525 miles, fuel consumption at cruising speed 9.5 gallons per hour, diameter of propeller 84 in. The wing (including ailerons) is 181.0 sq. ft., the total ailerons 12.35 sq. ft., fin 7.1 sq. ft., rudder 6.11 sq. ft., stabilizer 17.3 sq. ft., total elevators 13 sq. ft.

PERFORMANCE: The high speed 162 miles per hour at sea level, cruising speed 151 miles per hour at an altitude of 8200 ft., stalling speed 49 miles per hour, climb at sea level 1000 ft. per minute, service ceiling 18,000 ft.

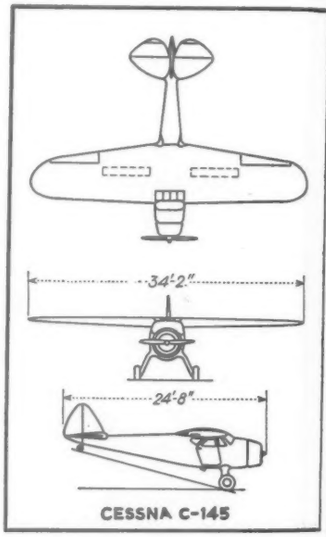
CONSTRUCTION MATERIAL: Wing spars are of laminated spruce, spruce ribs, fabric and aluminum alloy covering materials, fuselage is of welded steel tubing with fabric covering. The landing gear is of fixed type, wheel size 6.50 x 10, also available with 21 in. streamlines or 22 x 10-4 wheels with Goodyear hydraulic brakes, Cessna Oleo shock unit, wheel tail unit. Seats 4.



Tail Wheel

(For further specifications see table p. 109)

A. T. C. No. 701



CESSNA C-145

CESSNA Model T-50 TWIN

SPECIFICATIONS: Span 41 ft. 11 in., overall length 32 ft. 9 in., height overall 9 ft. 11 in., landing gear tread 151 in.; wing loading 17.3 lb. per. sq. ft., power loading 11.3 lb. per h.p., 3600 lb. weight empty, 5100 lb. gross weight; powered by a Jacobs engine with a rating of 450 hp. at sea level; fuel capacity 120 gallons. normal range 750 miles, fuel consumption at cruising speed 28 gallons per hour, diameter of propeller 93 in.; wing area (including ailerons) 295 sq. ft., total ailerons 18 sq. ft., fin 10.9 sq. ft., rudder 14.9 sq. ft., stabilizer 40 sq. ft., total elevators 22.7 sq. ft. Seats five.

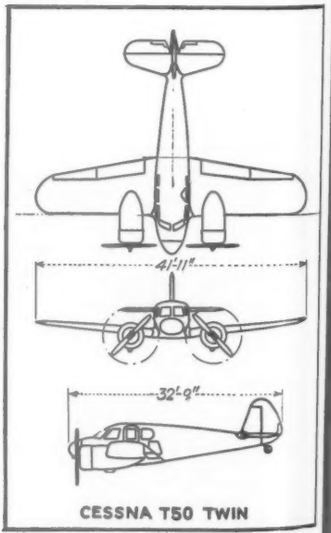
PERFORMANCE: High speed 195 m.p.h. at sea level; cruising speed 191 m.p.h. at an altitude of 7500 ft.; stalling speed 55 m.p.h., climb at sea level 1525 ft. per minute, service ceiling 22,000 ft.

CONSTRUCTION MATERIAL: Wing spars are of laminated spruce, spruce ribs, fabric and aluminum alloy covering materials, fuselage is of welded steel tubing. Plexiglas cockpit enclosures, landing-light covers. The landing gear is retractable type, wheel size 8.50 x 10, Goodyear hydraulic brakes, Bendix Oleo landing gear shock unit, wheel tail unit.

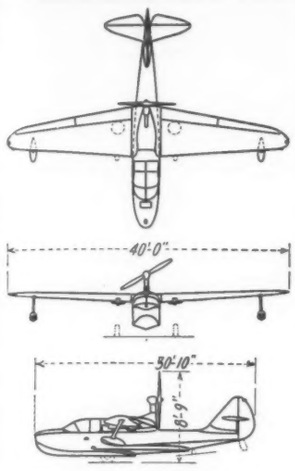
(For further specifications see table p. 109)

Wing Structure

A. T. C. No. 722



CESSNA T50 TWIN



COLGATE-LARSEN CL-15

SPECIFICATIONS: Span 40 ft., overall length 30 ft. 10 in., height overall 8 ft. 9 in., landing gear tread 98¾ in. Wing loading 14.5 lb. per sq. ft., power loading 14.3 lb. per h.p., 1,750 lb. weight empty, gross weight 2,860 lb., powered by a Ranger engine with a rating of 200 h.p. at sea level, fuel capacity 55 gallons, normal range 500 miles, diameter of propeller 96 in. Wing area (including ailerons) 197.5 sq. ft., total ailerons 16.08 sq. ft., fin 14.41 sq. ft., rudder 9.98 sq. ft., stabilizer 18.58 sq. ft., total elevators 10.30 sq. ft.

PERFORMANCE: High speed 140 miles per hour at sea level, cruising speed 125 miles per hour at sea level, stalling speed 50 miles per hour, climb at sea level 800 ft. per minute, service ceiling 14,500 ft. Seats 4.

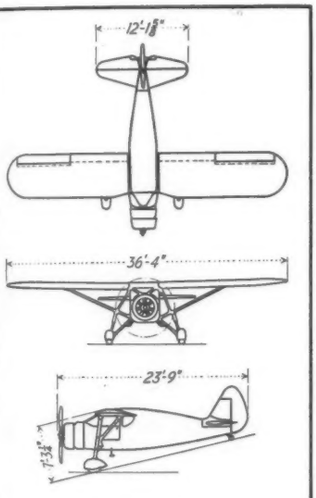
CONSTRUCTION MATERIAL: Box wing spar, 30 per cent chord; full web ribs; wing covering of plastic-bonded mahogany; fuselage is of modified NACA Model 35-B. Retractable type landing gear and tail wheel. Tail wheel 360 degree swivel.

STANDARD EQUIPMENT: This model is equipped with the following instruments, airspeed indicator, altimeter, compass, oil temperature, pressure gages, fuel pressure, temperature gages, eclipse electrical starter, tachometer; and accessories are the Lord engine mounting, Goodrich tires, Wood Hartzell propeller, Colgate-Larsen seats, Colgate-Larsen shock strut.

No A. T. C.

COLGATE-LARSEN Model CL-15

(For further specifications see table p. 109)

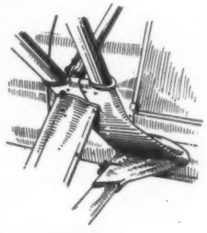


FAIRCHILD F-24

SPECIFICATIONS: Span 36 ft. 4 in., overall length 23 ft. 9 in., height overall 8 ft., landing gear tread 111 in., wing loading 13.2 lb. per sq. ft., power loading 17.58 lb. per hp., 1482 lb. weight empty 2550 lb. gross weight. It is powered by a Warner 145 h.p. engine at sea level, fuel capacity 60 gallons, normal range 720 miles, fuel consumption at cruising speed 9.5 gallons per hour, diameter of propeller 86 in. Wing area (including ailerons) 193.3 sq. ft., total ailerons 21 sq. ft., fin 6.1 sq. ft., rudder 10.1 sq. ft., stabilizer 21.9 sq. ft., total elevators 13.5 sq. ft.

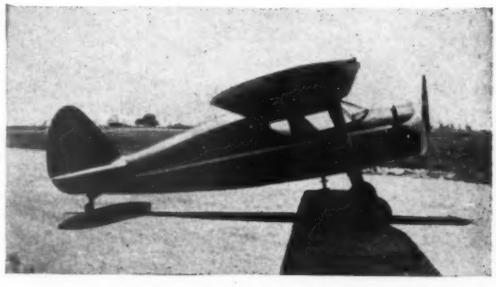
PERFORMANCE: High speed 135 miles per hour at sea level, cruising speed 122 miles per hour at an altitude of 7,000 ft., stalling speed 50 miles per hour, climb at sea level 720 miles per minute, service ceiling 15,700 ft. Seats 4.

CONSTRUCTION MATERIAL: Spars of solid spruce, spruce ribs, fabric covering material, fuselage is of welded steel tubing with fabric covering.



Strut Bracing

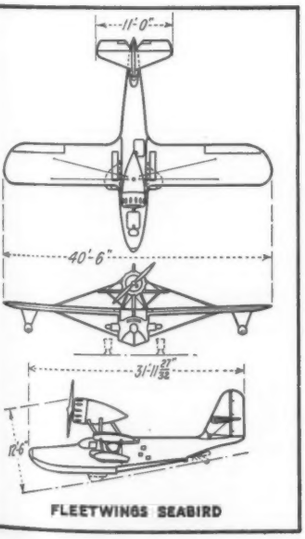
A. T. C. No. 707



FAIRCHILD Model F-24

Plexiglas cockpit enclosures, landing-light lenses. The landing gear is of fixed type, wheel type is Hayes and size is 7.50 x 10, Palmer hydraulic brakes, Oleo landing gear shock unit, wheel tail unit. The Fairchild four-place F-24 W-40 has the same standard equipment as the F-24.

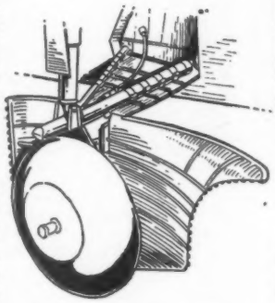
(For further specifications see table p. 109)



FLEETWINGS SEABIRD

SPECIFICATIONS: Span 40 ft. 6 in., overall length 32 ft., height overall 12 ft. 6 in., landing gear tread 93½ in. Wing loading 15.96 lb. per sq. ft., power loading 12.5 lb. per h.p., 2,453.7 lb. weight empty, gross weight 3,750 lb. Powered by a Jacobs engine with a rating of 300 h.p. at sea level, fuel capacity 70 gallons, normal range 516 miles, diameter of propeller 102 in. Wing area (including ailerons) 235 sq. ft., total ailerons 23.3 sq. ft., fin 18.9 sq. ft., rudder 12.5 sq. ft., stabilizer 8.7 sq. ft., total elevators 15.1 sq. ft. Seats 4.

PERFORMANCE: High speed 150 miles per hour at sea level, cruising speed 135 miles per hour, stalling speed 58 miles per hour, climb at sea level 914 ft. per minute, service ceiling 14,000 ft.



Retractable Gear

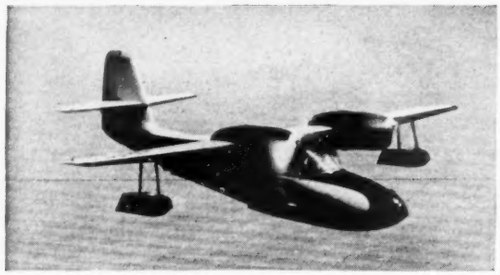
A. T. C. No. 680

FLEETWINGS Model F-501 Seabird

STANDARD EQUIPMENT: This model is equipped with the following instruments, bank and turn, rate of climb, compass, engine gages, head temperature, altimeter, air speed, and ammeter-voltmeter; has a two-position propeller and navigation and landing lights.

(For further specifications see table p. 109)

4 TO 5 SEATS



GRUMMAN Model No. G-44 (Widgeon)

SPECIFICATIONS: Span 40 ft., overall length 31 ft., overall height 9 ft., landing gear tread 90 in., wing loading 18.375 lb. per sq. ft., power loading 11.25 lb. per hp., weight empty 3,075, gross weight 4,500, powered by two Ranger engines with a total rating of 400 hp. at sea level, fuel capacity 108 gallons, normal range 775 miles, fuel consumption at cruising speed 20 gallons per hour, wing area (including ailerons) 245 sq. ft., aileron area (total) 14.6 sq. ft., fin area 17.3 sq. ft., rudder area 14 sq. ft., stabilizer area 25.8 sq. ft., total elevator area 19.6 sq. ft. Seats five.

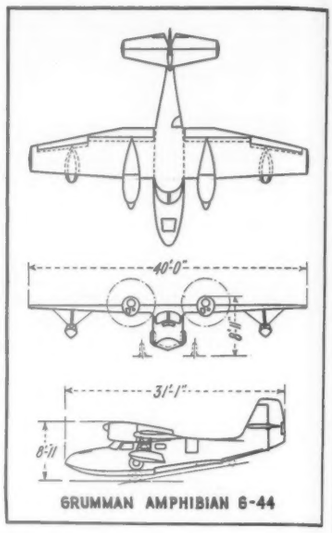
PERFORMANCE: Cruising speed 150 miles per hour at an altitude of 3,000 ft., stalling speed 61 miles per hour, climb at sea level 870 ft. per minute, service ceiling 15,000 ft.

CONSTRUCTION MATERIAL: Aluminum alloy box wing spars, aluminum alloy ribs, metal and fabric covering, retractable type landing gear, Hayes hydraulic brakes, Hayes wheels, size 7.50 x 10, Bendix Oleo landing gear shock unit, fuselage aluminum alloy.

STANDARD EQUIPMENT: This model is equipped with the following: two sets of engine instruments, compass, air speed indicator, turn-and-bank indicator, rate of climb, sensitive altimeter, two fuel quantity gages, volt-ameter, standard Lear receiver and transmitter.

(For further specifications see table p. 109)

No A. T. C.



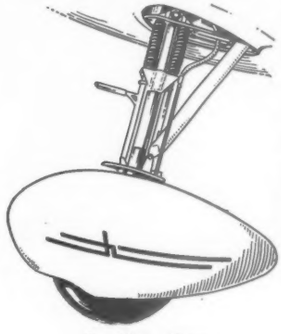
GRUMMAN AMPHIBIAN G-44

HOWARD Model DGA-15

SPECIFICATIONS: Span 38 ft., overall length 26 ft. 2¼ in., overall height 8 ft. 5 in., landing gear tread 100 in., wing loading 20.7 lb. per per sq. ft., power loading 13.6 lb. per hp., weight empty 2,500, gross weight 4,350 lb.; Wright engine, rated at 320 hp., fuel capacity 118 gallons, normal range 1,025 miles, fuel consumption at cruising speed 18.5 gallons per hour, diameter of propeller 99 in. Wing area (including ailerons) 210 sq. ft., total aileron area 18.54 sq. ft., fin area 11.72 sq. ft., rudder area 9.62 sq. ft., total elevator area 21.20 sq. ft.

PERFORMANCE: Cruising speed 175 miles per hour at an altitude of 8,500 ft., stalling speed 60 ft., climb at sea level 1,050 ft. per minute, service ceiling 17,500 ft. Seats five.

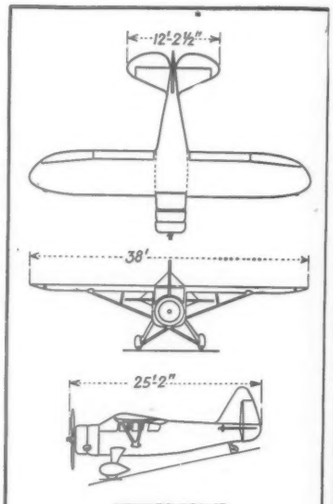
CONSTRUCTION MATERIAL: Wing spars are of solid spruce, spruce ribs, plywood covering material, fuselage is of welded steel tubing covered with aluminum alloy and fabric. Plexiglas cockpit enclosures. The landing gear is of fixed type, wheel size 8.50 x 10, Goodyear hydraulic brakes.



Landing Gear

(For further specifications see table p. 109)

A. T. C. No. 717



HOWARD DGA-15

STINSON Model SR-10J

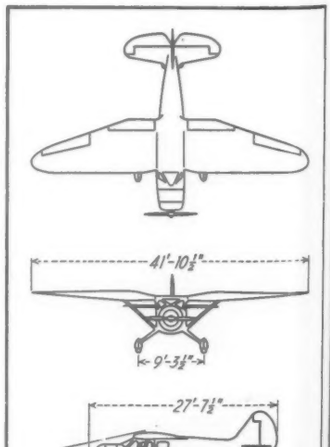
SPECIFICATIONS: Span 41 feet 10½ inches, length overall 27 feet 10¼ inches, height overall 8 feet 7 inches. Landing gear tread 111½ inches. Wing loading 16.0 pounds per square foot, power loading 14.6 pounds per horse power, weight empty 4,650 pounds, gross weight 4,150 pounds. It is powered by a Lycoming engine with Lord mountings. Total rated horse power 285 at sea level, fuel capacity 100 gallons, normal range 835 miles, fuel consumption at cruising speed 18.8 gallons per hour, propeller diameter 102 inches. Wing (including ailerons) 258.5 square feet, aileron area (total) 22.02 square feet, fin area 12.0 square feet, rudder area 15.16 square feet, stabilizer 25.08 square feet, total elevator area 19.75 square feet.

PERFORMANCE: Cruising speed 155 miles per hour at 4,000 feet, stalling speed 60 miles per hour, climbs at sea level 1,040 feet per minute, service ceiling 15,800 ft. Seats 4 to 5.

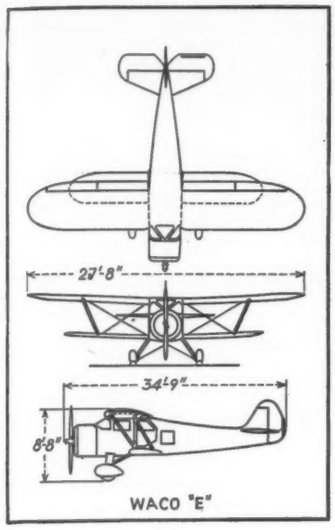
CONSTRUCTION MATERIAL: Wings have welded steel tubing truss spars, Rusco aluminum alloy ribs, fabric covering, fixed landing gear, Hayes 7.50 x 10 wheels, Goodrich hydraulic brakes, Spring Oleo landing gear shock unit, wheel tail unit, welded steel tubing fabric covered fuselage.

(For further specifications see table p. 109)

No A. T. C.



STINSON SR-10J

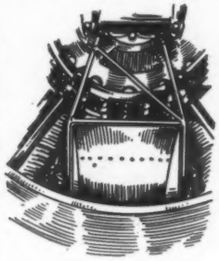


WACO "E"

SPECIFICATIONS: Span of model SRE 34 ft. 9 in., overall length 27 ft. 8 in., overall height 8 ft. 8 in., landing gear tread 101 in., wing loading 17.06 lb. per sq. ft., power loading 10.5 lb. per hp., weight empty 2,734, gross weight 4,200. The Waco E is available with Lycoming, Jacobs, P. & W. or Wright engines. Powered by a P. & W. Wasp, Jr., it has a rating of 400 hp. at 5,000 ft., fuel capacity 125 gallons, normal range 840 miles, fuel consumption at cruising speed 22.7 gallons per hour, wing area (including ailerons) 246 sq. ft. Seats 5.

PERFORMANCE: High speed 200 miles per hour at sea level, cruising speed 195 miles per hour at an altitude of 9,600 ft., stalling speed 60 miles per hour, climb at sea level 1,550 ft. per minute, service ceiling 23,500 ft.

CONSTRUCTION MATERIAL: Wing spars are of spruce, spruce ribs, plywood covering material, the wheel size is 7.50 x 10, Goodyear hydraulic brakes, Waco Oleo landing gear shock unit, wheel tail unit.

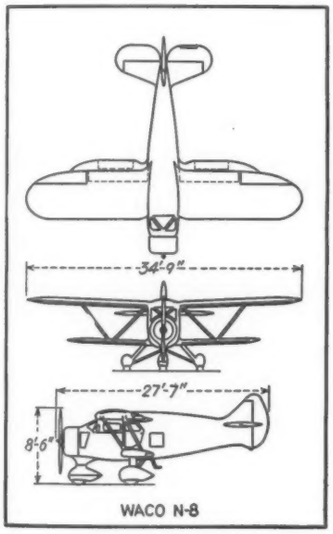

Air Intake Scoop

STANDARD EQUIPMENT: This model is equipped with the following instruments: compass, tachometer, altimeter, air speed, oil pressure, oil temperature and gas gages, manifold press thermocouple and Lord instrument and engine mountings.

A. T. C. No. 714

WACO Model E

(For further specifications see table p. 109)



WACO N-8

SPECIFICATIONS: Span 34 ft. 9 in., overall length 27 ft. 7 in., height overall 8 ft. 6 in., landing gear tread 99 in., wing loading 15.45 lb. per sq. ft., power loading 12.67 lb. per hp., weight empty 2,564, gross weight 3,800 lb. Powered by a Jacobs engine with a rating of 300 hp. at altitude of 3,700 ft., fuel capacity 95 gallons, normal range 625 miles, fuel consumption at cruising speed 17.4 gallons per hour, wing area (including ailerons) 246 sq. ft.

PERFORMANCE: High speed 161 miles per hour at sea level, cruising speed 151 miles per hour at an altitude of 8,500 ft., stalling speed 56 miles per hour, climb at sea level 950 ft. per minute, service ceiling 14,200 ft. Seats 5.

CONSTRUCTION MATERIAL: Wing spars are of spruce, spruce ribs, fabric covering. The wheel size is 8.50 x 10, Goodyear hydraulic brakes, Waco Oleo landing gear shock unit.

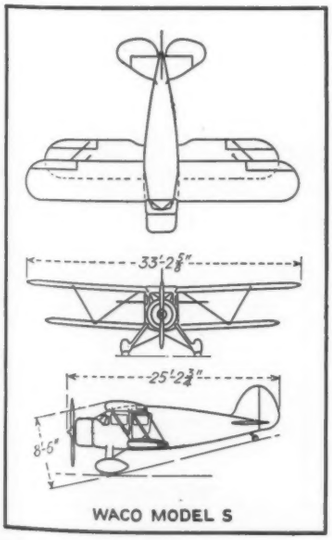
Nose Wheel

A. T. C. No. 677

WACO Model N

STANDARD EQUIPMENT: This model is equipped with the following instruments: compass, tachometer, altimeter, air speed, oil pressure, oil temperature, gas gages, manifold press, thermocouple, Lord instrument mountings.

(For further specifications see table p. 109)



WACO MODEL S

SPECIFICATIONS: The Waco S is available with Jacobs or Continental engines. Model YKS: span 33 ft. 3 in., overall length 25 ft. 4 in., overall height 8 ft. 4 in., landing gear tread 102 in., wing loading 13.32 lbs. per sq. ft., power loading 14.44 lb. per hp., weight empty 1,945, gross weight 3,250. Powered by a Jacobs engine, with the rating of 225 hp. at sea level, fuel capacity 70 gallons, normal range 518 miles, fuel consumption at cruising speed 15.5 gallons per hour, wing area (including ailerons) 244 sq. ft. Model ZKS has a power loading of 11.40 lb. per hp., 1,981 empty weight, total rated hp. 285, at sea level, normal range 504 miles (all range figures with 15% reserve fuel), fuel consumption at cruising speed 17 gallons per hour. Seats 5.

PERFORMANCE: High speed 144 miles per hour at sea level, cruising speed 135 miles per hour at an altitude of 6,000 to 10,000 ft., stalling speed 52 miles per hour, climb at sea level 750 ft. per minute, service ceiling 12,500 ft.

CONSTRUCTION MATERIAL: Wing spars are of spruce, spruce ribs, fabric covering material, wheel size is 7.50 x 10, Hayes hydraulic brakes, Waco Oleo landing gear shock unit, wheel tail unit.

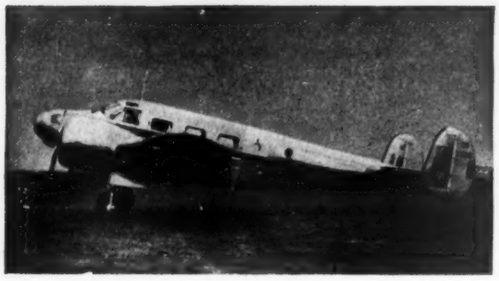
A. T. C. No. 626

WACO Model S

STANDARD EQUIPMENT: This model is equipped with the following instruments: compass, tachometer, altimeter, air speed, oil pressure, oil temperature and gas gages and voltammeter, Lord instrument mountings. Approved for floats.

(For further specifications see table p. 109)

CIVIL AIRCRAFT 6 OR MORE SEATS



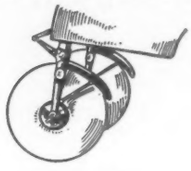
BEECH Model 18S

SPECIFICATIONS: Span 47 ft. 8 in., overall length 34 ft. 3 in., height overall 9 ft. 5 in., landing gear tread 154¾ in., wing loading 21.5 lb. per sq. ft., power loading 8.3 lb. per hp., weight empty 5,056 lb., gross weight 7,500 lb. The two P. & W. Wasp, Jr. engines are rated at 900 hp. at sea level, the fuel capacity is 210 gallons, normal range 1,100 miles, fuel consumption at cruising speed 43 gallons per hour, diameter of the propeller is 99 in., area of wing (including ailerons) 347 sq. ft., total aileron area 23.9 sq. ft., fin area 16.3 sq. ft., rudder area 17.3 sq. ft., stabilizer area 38.2 sq. ft., total elevator area 27.2 sq. ft. Seats 8 or 9.

PERFORMANCE: High speed of 230 m.p.h. at sea level, cruising speed of 220 m.p.h., at altitude of 12,000 ft., stalling speed 61 m.p.h., climb at sea level 1,850 ft. per minute, service ceiling 27,000 ft.

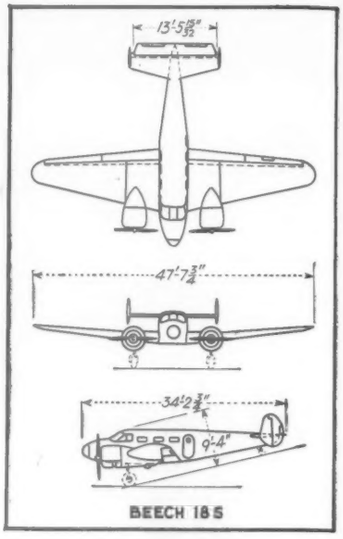
CONSTRUCTION MATERIAL: Welded steel tubing wing spars, aluminum alloy ribs, aluminum alloy covering, fuselage is of aluminum alloy; retractable landing gear, Goodyear wheel, size 29 x 135, Goodyear hydraulic brakes, air, oil shock unit, retractable wheel tail unit. Plexiglas cockpit enclosures and similar transparent sections.

(For further specifications see table p. 109)



Landing Gear

A. T. C. No. 710



BEECH 18S

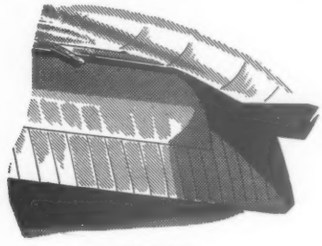
BOEING Model 307-B

SPECIFICATIONS: The span is 107 ft. 3 in., overall length 74 ft. 4 in., overall height 20 ft. 9½ in., wing loading 30.2 lb. per sq. ft., power loading 12.5 lb. per hp., empty weight 30,000, gross weight 45,000 lb., powered by four Wright Cyclone engines with total rated hp. 4,400 at sea level, fuel capacity 1,700 gallons, normal range 1,675 miles, fuel consumption at cruising speed 158 gallons per hour, diameter of propellers 138 in., wing area (including ailerons) 1,486 sq. ft. Seats 38.

PERFORMANCE: The high speed is 250 miles per hour at an altitude of 16,200 ft., cruising speed 222 miles per hour, at an altitude of 19,000 ft., stalling speed 70 miles per hour, climb at sea level 1,200 ft. per minute, service ceiling 24,000 ft.

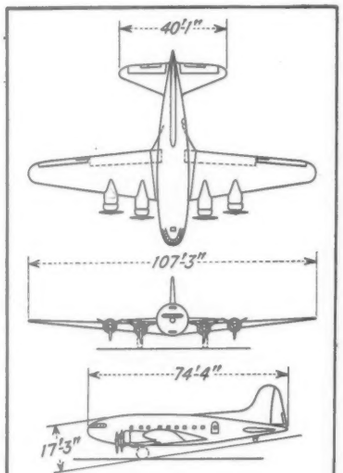
CONSTRUCTION MATERIAL: Plexiglas is used for cockpit enclosures and similar transparent sections.

(For further specifications see table p. 109)

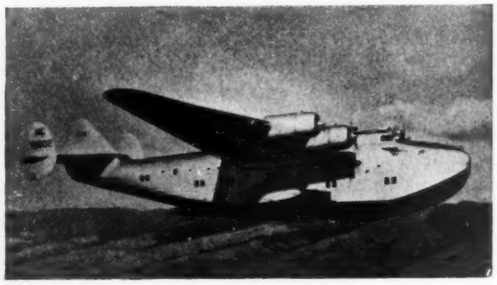


Wing Flap

A. T. C. No. 726



BOEING STRATOLINER 307



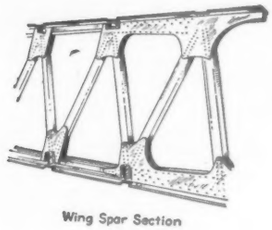
BOEING Model 314

SPECIFICATIONS: Span 152 feet, overall length 106 feet, overall height 27 feet 7 inches, wing loading 29.3 pounds per square foot, power loading 17.5 pounds per horse power, empty weight 48,545 lb., gross weight 84,000 pounds, powered by 4 Wright double row Cyclones, total rating of 6,000 horse power at sea level, fuel capacity 4,200 gallons, normal range 3,100 miles, diameter of propeller 168 inches, wing area, including ailerons, 2,867 square feet. Equipped with Lord instrument and engine mountings. Seats 89.

PERFORMANCE: High speed 190 miles per hour, cruising speed, 175 miles per hour at an altitude of 10,000 feet, stalling speed 70 miles per hour, climb at sea level 650 feet per minute, service ceiling 14,000 feet.

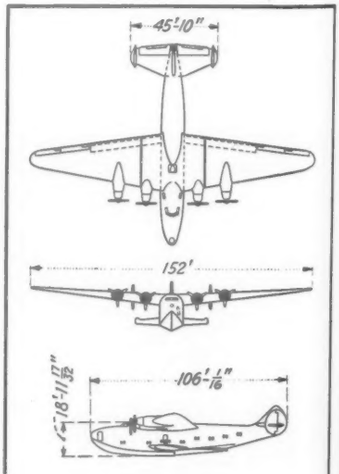
CONSTRUCTION MATERIAL: Wing spars are of aluminum alloy and steel, ribs of aluminum alloy, covering material of Alclad. The fuselage is riveted Alclad. Plexiglas is used for cockpit enclosures, landing - light covers and similar transparent sections.

(For further specifications see table p. 109)

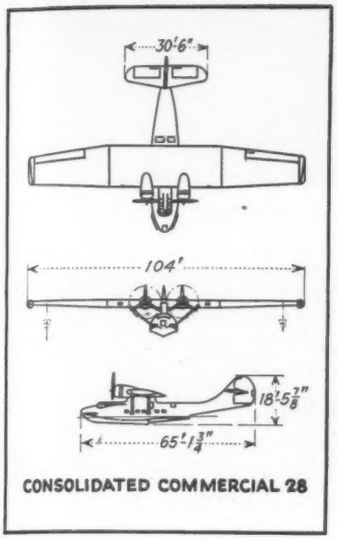


Wing Spar Section

A. T. C. No. 704



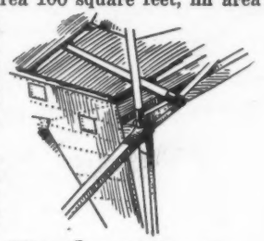
BOEING 314



CONSOLIDATED COMMERCIAL 28

SPECIFICATIONS: Span 104 feet, length overall 65 feet 2 inches, height overall 19 feet 9 inches. Wing loading 21.8 pounds per square foot, power loading 12.7 pounds per horsepower, gross weight 30,500 pounds. It is powered by two Pratt and Whitney Twin Wasp engines. Total rated horsepower 2,100 at an altitude of 7,500 feet. Normal range 2,200 miles. The area of wing (including ailerons) 1,400 square feet, total aileron area 100 square feet, fin area 60.8 square feet, rudder area 50 square feet, stabilizer area 119.8 square feet, total elevator area 85 square feet. Seats 17 to 24.

PERFORMANCE: High speed 198 miles per hour at an altitude of 7,500 feet, cruising speed 185 miles per hour at an altitude of 10,000 feet, stalling speed 68 miles per hour, service ceiling 18,500 feet.



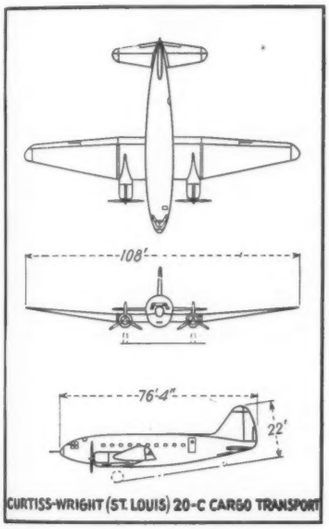
Wing Float Retracting Mechanism

CONSTRUCTION MATERIAL: The wings have riveted aluminum alloy spars, aluminum alloy ribs, aluminum alloy and fabric covering material, aluminum alloy riveted monocoque hull.

No A. T. C.

CONSOLIDATED Commercial Model 28

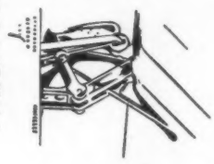
(For further specifications see table p. 109)



CURTISS-WRIGHT (ST. LOUIS) 20-C CARGO TRANSPORT

SPECIFICATIONS: Span 108 ft., overall length 76 ft. 4 in., overall height 22 ft., landing gear tread 311 in., wing loading 29.4 lb. per sq. ft., power loading 11.8 lb. per hp., weight empty 23,545 lb., gross weight 40,000 lb., powered by 2 Wright Cyclone double-row engines, total rated hp. 1,500 each at an altitude of 7,000 ft., fuel capacity 1,000 gallons, normal range 1,570 miles, fuel consumption at cruising speed 140 gallons per hour, diameter of propeller 180 in., wing area (including ailerons) 1,360 sq. ft., total aileron area 79.2 sq. ft., fin area 115.4 sq. ft., rudder area 52.8 sq. ft., stabilizer area 158.5 sq. ft., total elevator area 95.0 sq. ft.

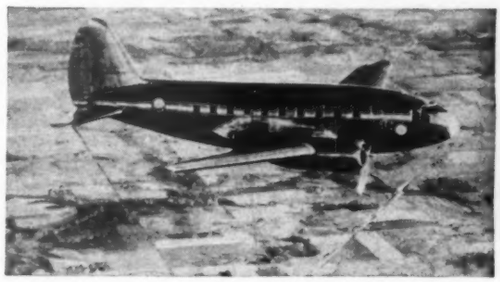
PERFORMANCE: High speed 262 m.p.h. at an altitude of 13,000 ft., cruising speed 222 m.p.h. at an altitude of 10,000 ft., stalling speed 72 m.p.h., climb at sea level 1,500 ft. per minute, service ceiling 26,900 ft.



Flap Control

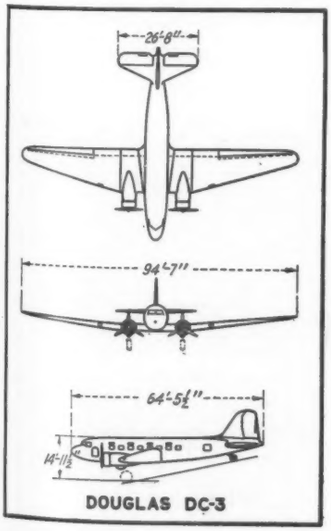
CONSTRUCTION MATERIAL: Alclad wing spars, Alclad ribs, Alclad covering, retractable type of landing gear, wheel size 19 x 23, hydraulic brakes, Oleo pneumatic landing gear shock unit, Alclad fuselage.

No A. T. C.



CURTISS-WRIGHT (St. Louis) Model 20-C

(For further specifications see table p. 109)



DOUGLAS DC-3

SPECIFICATIONS: Span 95 feet, length overall 64 feet 6 inches, height overall 16 feet 11 inches, landing gear tread 222 inches. Wing loading 25.5 pounds per square foot, power loading 10.5 pounds per hp., weight empty 16,600 pounds, gross weight 25,200 pounds. It is powered by 2 Wright Cyclone engines. Total rated hp. 2,000 at 6,900 feet. Fuel capacity 822 gallons, normal range 2,125 miles. Fuel consumption at cruising speed 104 gallons per hour. Propeller diameter 138 inches. Wing area (including ailerons) 987 square feet, aileron area (total) 102.8 square feet, fin area 47.1 square feet, rudder area 46.3 square feet, stabilizer area 128 square feet, total elevator area 82.3 square feet.

PERFORMANCE: High speed 220 miles per hour at 7,900 feet, cruising speed 194 miles per hour at 11,200 feet, stalling speed 67 miles per hour. Climb at sea level 1,070 feet per minute, service ceiling 21,900 feet.

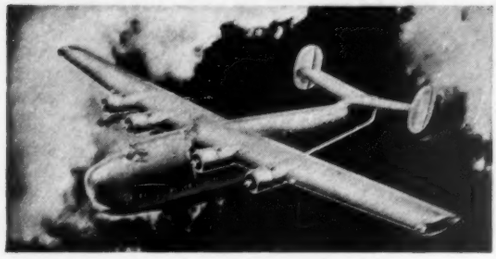
CONSTRUCTION MATERIAL: Wings have Alclad spars, Alclad ribs, and Alclad covering material. The model has retractable type landing gear, Bendix 45 x 17-16 wheels, Bendix hydraulic brakes, Bendix Oleo pneumatic landing gear shock unit, wheel tail unit, and Alclad riveted fuselage. Seats 21.

A. T. C. No. 618

DOUGLAS Model No. DC-3

(For further specifications see table p. 109)

6 OR MORE SEATS

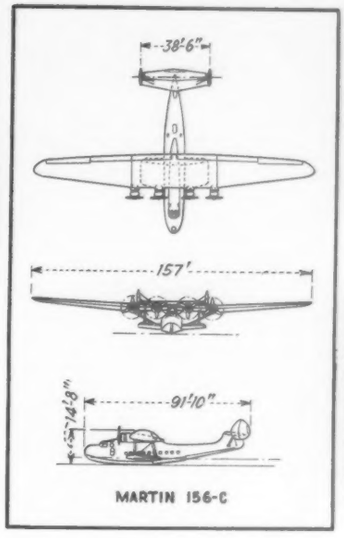


CONSOLIDATED Model 29 No A. T. C. Number

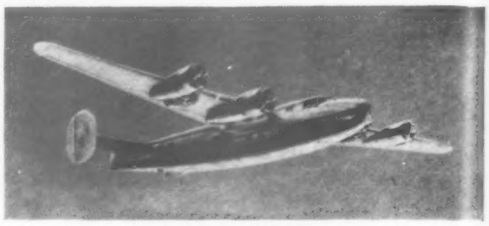
SPECIFICATIONS: Span 115 ft., overall length 79 ft. 3 in., overall height 25 ft. 4 in., wing loading 36.5 lb. per sq. ft., power loading 13.5 lb. per hp., gross weight 65,000 lb., powered by four P. & W. Twin Wasp engines with total rated hp. 4,200 at an altitude of 7,500 ft., normal range 3,700 miles, area of wing (including ailerons) 1,780 sq. ft.

PERFORMANCE: High speed 226 m.p.h., at an altitude of 7,500 ft., cruising speed 209 m.p.h.

(For further specifications see table p. 109)



GLENN L. MARTIN Model No. 156-C



CONSOLIDATED Model 32

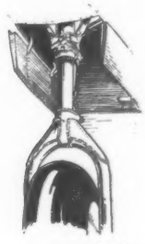
DOUGLAS Model DC-4

SPECIFICATIONS: Span 117 ft. 6 in., overall length 93 ft. 10 in., overall height 27 ft. 9 in., the landing gear tread is 296 in., wing loading 35.6 lb. per sq. ft., power loading 10 lb. per hp., weight empty 34,425, gross weight 52,000 lb., powered by four Pratt & Whitney engines with a total rated hp. of 4,400 at an altitude of 6,200 ft., fuel capacity 1,700 gallons, normal range 2,540 miles, fuel consumption at cruising speed 221 gallons per hour, propeller diameter 156 in. Wing area (including ailerons) 1,462 sq. ft., total aileron area 120.4 sq. ft., fin area 72.5 sq. ft., rudder area 63.4 sq. ft., stabilizer area 210 sq. ft., total elevator area 118.6 sq. ft.

PERFORMANCE: High speed 265 miles per hour at an altitude of 16,900 ft., cruising speed 242 miles per hour at an altitude of 15,700 ft., stalling speed 78 miles per hour, climb at sea level 1,350 ft. per minute, service ceiling 26,600 ft.

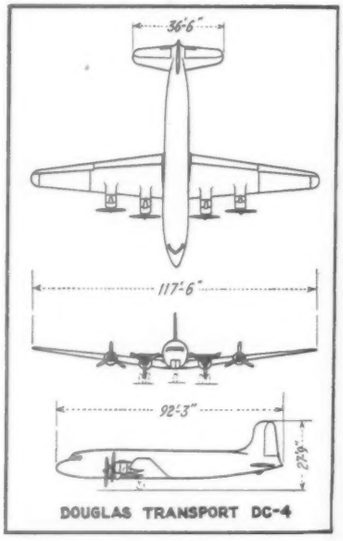
CONSTRUCTION MATERIAL: Alclad wing spars, Alclad ribs, Alclad covering. Plexiglas is used for cockpit enclosures and similar transparent sections. The landing gear is of retractable tricycle type, wheel size 42 x 15.50-16, wheel type Goodyear, Goodyear hydraulic brakes. Bendix Oleo pneumatic landing gear shock unit, fuselage riveted Alclad.

(For further specifications see table p. 109)

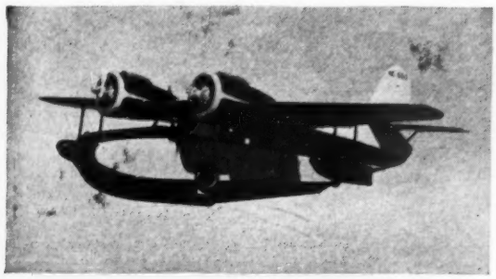


Nose Wheel

No A. T. C. Number



DOUGLAS TRANSPORT DC-4



GRUMMAN G-21A

SPECIFICATIONS: Span 49 ft., overall length 38 ft. 4 in., height overall 12 ft., landing gear tread 90⅝ in., wing loading 21.3 lb. per sq. ft., power loading 8.9 lb. per hp., weight empty 5,475 lb., gross weight 8,000 lb. This model is equipped with two P. & W. Wasp Jr. engines rated at 800 hp. at an altitude of 5,000 ft., fuel capacity is 220 gallons, normal range 1,000 miles, fuel consumption at cruising speed 51 gallons per hour, diameter of the propeller 102 in., area of wing (including ailerons) 375 sq. ft., total aileron area 22.5 sq. ft., fin area 26.7 sq. ft., rudder area 21 sq. ft., stabilizer area 44.8 sq. ft., total elevator area, 31.2 sq. ft.

PERFORMANCE: High speed of 201 m.p.h. at an altitude of 5,000 ft., cruising speed 190 m.p.h. at an altitude of 9,600, stalling speed 62 m.p.h., climb at sea level 1,300 ft. per m., service ceiling 22,000 ft.

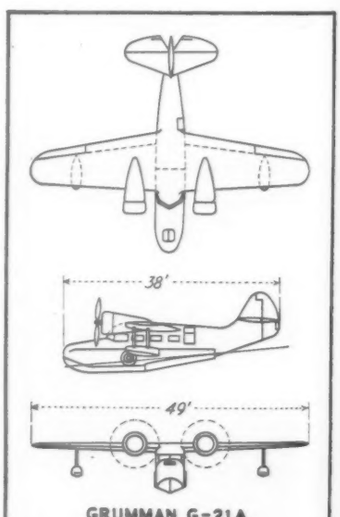
CONSTRUCTION MATERIAL: Aluminum alloy box wing spars, aluminum alloy ribs, metal covering, fuselage is of aluminum alloy monocoque type. Plexiglas is used for cockpit enclosures and similar transparent sections.

STANDARD EQUIPMENT includes the following instruments: 2 sets of engine instruments, standard set flight instruments, accessories include: Lord shock mountings, Goodrich tires, Hayes brakes, Hamilton propeller, Bendix shock struts, Adams, Westlake and Grimes lights.

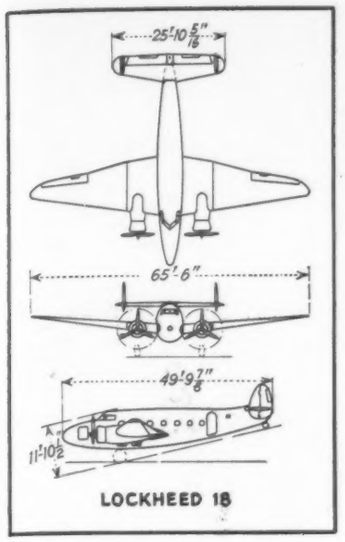
(For further specifications see table p. 109)

Engine Mount and Oil Cooler

A. T. C. No. 654



GRUMMAN G-21A



LOCKHEED 18

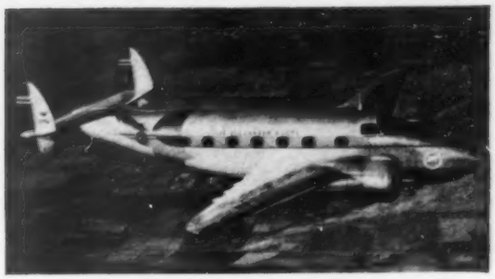
SPECIFICATIONS: The Model 18 is available with P. & W. or Wright engines of different ratings. Dimensions of model 18-10 are: span, 65 ft. 6 in., overall length 49 ft. 9⅞ in., overall height 11 ft. 10½ in., the landing gear tread 184 in., wing loading 33.50 lb. per sq. ft., power loading 8.80 lb. per hp., weight empty 12,208 lb., gross weight 8,500 lb. When powered by two Pratt & Whitney Twin Wasp engines it is rated at 2,100 hp. at an altitude of 7,500 ft. Fuel capacity is 644 gallons, normal range 1,540 miles, fuel consumption at cruising speed 95 gallons per hour.

PERFORMANCE: High speed 263 m.p.h. at an altitude of 8,800 ft.; cruising speed 239 m.p.h. at an altitude of 15,000 ft. Stalling speed 70 m.p.h., climb at sea level 1,850 ft. per minute, service ceiling 23,500 ft.

CONSTRUCTION MATERIAL: Wing spars are of Alclad and Rusco, ribs and covering material

Tail Wheel

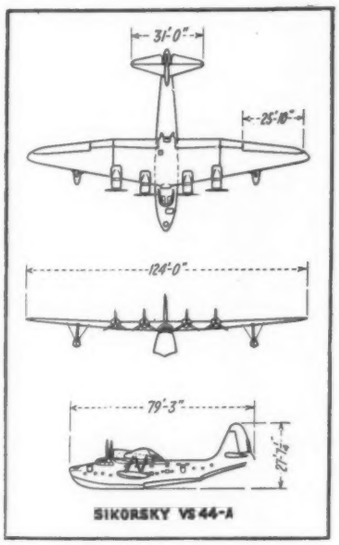
A. T. C. No. 723



LOCKHEED Model 18

are of Alclad, Plexiglas is used for cockpit enclosures and similar transparent sections. The monocoque fuselage is of Alclad and Rusco. The landing gear is of retractable type. Wheels are Goodyear and measure 42.31 x 15.6, Goodyear hydraulic brakes. This model is also equipped with Aerol landing gear shock unit and wheel tail unit.

(For further specifications see p. 109)



SIKORSKY VS 44-A

SPECIFICATIONS: Dimensions of this model are: 124 ft. span, overall length 79 ft. 3 in., overall height 27 ft. 7¼ in. Wing loading weight 34.4 lb. per sq. ft., power loading 13.7 lb. per hp., weight empty 30,200 lb., gross weight 57,500 lb. It is powered by four Pratt & Whitney Hornets, totaled rated horse power of 4,200 at an altitude of 7,500 ft. The fuel capacity is 3,900 gallons and has a normal range of 3,800 miles. The propellers measure 150 inches in diameter. The wing area including ailerons is 1,670 square feet. The Model S 43 B, an earlier design—see photo, and 3-view below—is powered by 2 Pratt & Whitney Wasp engines, has a total rated h.p. of 1,500 at an altitude of 7,000 ft. The fuel capacity is 400 gallons, normal range 775 miles, diameter of propeller 138 in. Wing area (including ailerons) 780.6 sq. ft., total aileron 53.2 sq. ft., fin 26.8 sq. ft., rudder 30.74 sq. ft., stabilizer 86.4 sq. ft., total elevators 58.47 sq. ft. The S-43-B wings have aluminum alloy box spar, aluminum alloy ribs, aluminum alloy fabric covering material.

PERFORMANCE: The VS-44-A has a cruising speed of 175 miles per hour at an altitude of

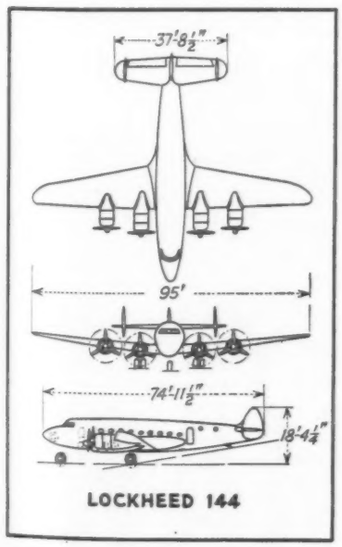
No A. T. C.

VOUGHT-SIKORSKY Model VS-44-A

7,500 ft. The stalling speed is 65 m.p.h. Climb at sea level 600 ft. per minute. Service ceiling 17,000 ft.

CONSTRUCTION MATERIAL: The VS-44-A wing spar is made of aluminum alloy, truss type; aluminum alloy ribs and covered with aluminum alloy and fabric.

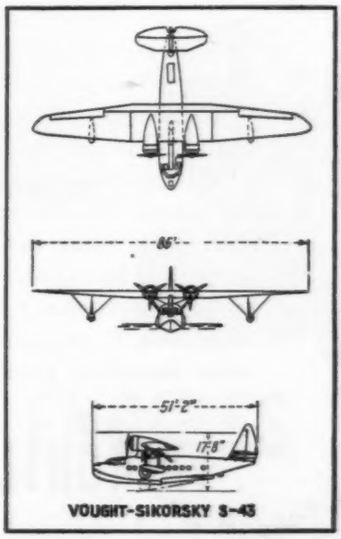
(For further specifications see p. 109)



LOCKHEED 144

LOCKHEED Model 144 No. A.T.C.

VOUGHT-SIKORSKY Model S-43 A.T.C. No. 593



VOUGHT-SIKORSKY S-43

Travel six hours without refueling

. . . with all seats occupied

. . . in a Fairchild "24"

A WARNER FAIRCHILD "24" will fly non-stop with four big people from Chicago to New York without benefit of tail-winds and still offer a twenty minute reserve at the end of the trip!

This generous range—accomplished with standard equipment (two thirty-gallon tanks)—means a great deal to the thoughtful private owner in safety, convenience and block-to-block speed. It means that you can make long detours around bad weather when others must land. It means that you have ample reserve to avoid hazardous landing on unfamiliar terrain as a result of getting lost. It means that you can complete schedules without the annoyance of frequent and time-consuming refueling operations. It means that whenever it is necessary for you to continue flying, you can do so in a Warner Fairchild "24" for six full hours, and without the slightest sacrifice of passenger payload.

To this important feature, add a Warner engine of 145 or 165 husky horses, three-position manually operated flaps, steerable tailwheel, hydraulic brakes, traditional Fairchild quality—and you will instantly see why Fairchild sales are now booming to new record highs.

FAIRCHILD AIRCRAFT

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Something you will never find in the performance figures . . .

Reliable, economical performance over the lifetime of an engine is a function of sound design and precision production. Endless hours are spent by Ranger in making sure that materials and manufacture are as perfect as modern science and human effort can assure. Doggedly testing the capacity of every Ranger spring to meet all the conceivable stresses of engine operation is dull but essential. Nothing is left to chance, for with Ranger there can be no compromise with quality.

RANGER AIRCRAFT ENGINES

Farmingdale, Long Island, New York

DIVISION OF FAIRCHILD ENGINE & AIRPLANE CORPORATION

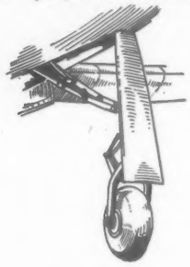
MILITARY

BELL Model P-39 Airacobra

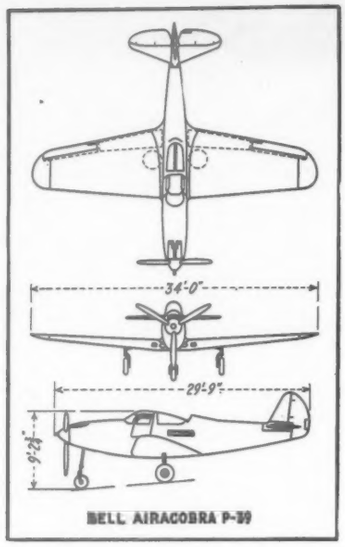
SPECIFICATIONS: Span 34 ft.. length overall 29 ft. 9 in., height overall 9 ft. 2.75 in., landing gear tread 136 inches, wing loading 31.03 lb. per square foot, power loading 6.07 lb. per horse power, weight empty 4,955, gross weight 6,662, powered by an Allison engine, total rated horse power 1,090 at an altitude of 15,000 feet, fuel capacity 140 gallons, normal range 1,560 miles, fuel consumption at cruising speed 56.6 gallons per hour, diameter of propeller 124.5 in., wing area (including ailerons) 213 sq. ft., total aileron area 15.04 sq. ft., fin area 9.81 sq. ft., rudder area 10.22 sq. ft., stabilizer area 24.22 sq. ft., total elevator area 17.34 sq. ft.

CONSTRUCTION MATERIAL: The wings have metal spars, metal ribs, stressed skin covering material, retractable tricycle type of landing gear, wheel size 26 inches x 6 inches, hydraulic brakes, Oleo landing gear shock unit, monocoque fuselage.

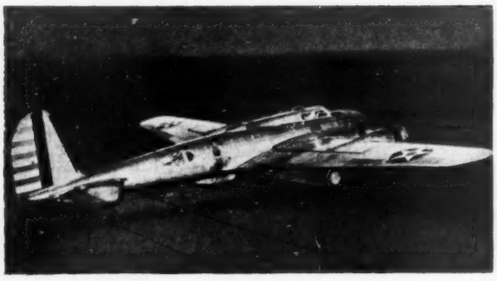
(For further specifications see table p. 115)



Nose Wheel



BELL AIRACOBRA P-39



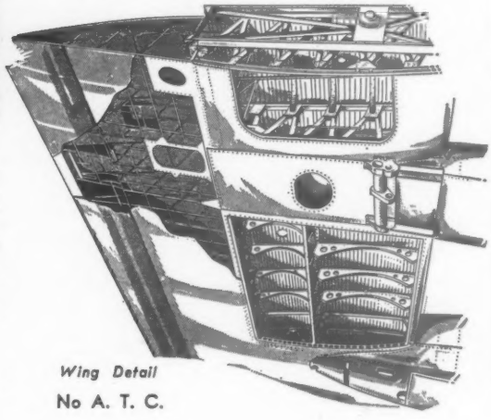
BOEING Model B-299-T, Flying Fortress

SPECIFICATIONS: The span is 103 feet 9⅜ inches, length overall 67 feet 10$^{9}/_{16}$ inches, height overall 15 feet 4½ inches, wing loading 33.5 pounds per square foot, power loading 11.88 lb. per horsepower, weight empty 31,160 pounds, gross weight 47,500 pounds. It is powered by 4 Wright Cyclone engines, total rated horsepower 4,800 at sea level, fuel capacity 1,700 gallons, normal range over 3,000 miles, diameter of propeller 138 inches.

PERFORMANCE: High speed 325 miles per hour, stalling speed 70 miles per hour, climb at sea level 2,260 feet per minute, service ceiling 36,700 feet.

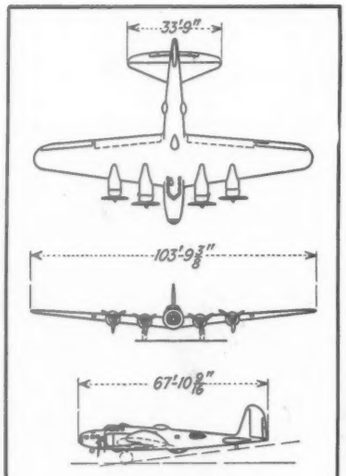
CONSTRUCTION MATERIAL: Aluminum alloy wing spars, aluminum alloy ribs, Alclad covering material, retractable type of landing gear, Oleo pneumatic landing gear shock unit, retractable wheel tail unit, riveted aluminum alloy Alclad fuselage.

(For further specifications see table p. 115)

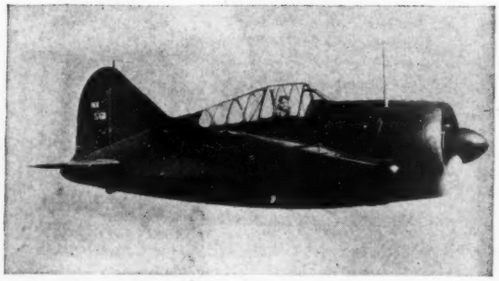


Wing Detail

No A. T. C.



BOEING B-299



BREWSTER Model No. 339

SPECIFICATIONS: Span 35 ft., length overall 25 ft. 7⅜ in., overall height 12 ft. It is powered by a Wright Cyclone engine rated at 800 hp. Fuel capacity 160 gallons, the propeller measures 123 in. in diameter.

CONSTRUCTION MATERIAL: Wing spars are of steel, single metal box spar, aluminum truss ribs, aluminum covering, retractable type landing gear, streamlined wheels, 27 in. hydraulic brakes, Oleo pneumatic landing gear shock unit, monocoque fuselage.

STANDARD EQUIPMENT: Kollsman, Sperry, Pioneer, Elgin, Weld & Kiddy instruments, Bendix shock mountings, General tires, Hayes brakes, Curtiss propeller, Bendix seats, Arens controls, Torrington bearings, Oleo shock strut, Mazda lights. Radio: Model G F series.

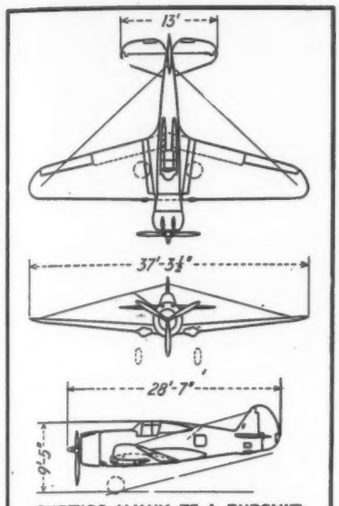
CONSOLIDATED Model 28—Military Amphibian

SPECIFICATIONS: Span 104 feet, length overall 65 feet 2 inches, height overall 19 feet 9 inches, landing gear tread 16 feet 7 inches, wing loading 22.8 pounds per square foot, power loading 13.3 pounds per horse power, gross weight 32,000 pounds, powered by 2 Pratt & Whitney Twin Wasp engines, total rated horse power 2,100 at an altitude of 7,500 feet, normal range 3,300 miles, wing area (including ailerons) 1,400 square feet, total aileron area 100 square feet, fin area 60.8 square feet, rudder area 50 square feet, stabilizer area 119.8 square feet, total elevator area 85 square feet.

PERFORMANCE: High speed 196 miles per hour at an altitude of 7,500 feet, cruising speed 183 miles per hour, at an altitude of 10,000 feet, stalling speed 68 miles per hour, service ceiling 17,000 feet.

CONSTRUCTION MATERIAL: Aluminum alloy riveted wing spars, aluminum alloy ribs, aluminum alloy fabric covering. Retractable type of landing gear, wheels are of smooth contour type size 47 inches, hydraulic brakes, Oleo landing gear shock unit, aluminum alloy, riveted monocoque fuselage.

(For further specifications see table p. 115)



CURTISS HAWK 75-A PURSUIT

SPECIFICATIONS: Span is 37.3 feet, length overall 28.8 feet, height overall 9.5 feet. Wing loading 24.3 pounds per square foot, power loading 4.8 pounds per horsepower, empty weight 4,541 pounds, gross weight 5,731 pounds. It is powered by a Wright engine, total rated horsepower 1,000 at an altitude of 15,000 feet. Fuel capacity 163 gallons, normal range 1,003 miles. Wing area (including ailerons) 236 square feet, fin area 7 square feet. rudder area 13.7 square feet, stabilizer area 28.8 square feet, total elevator area 19.2 square feet.

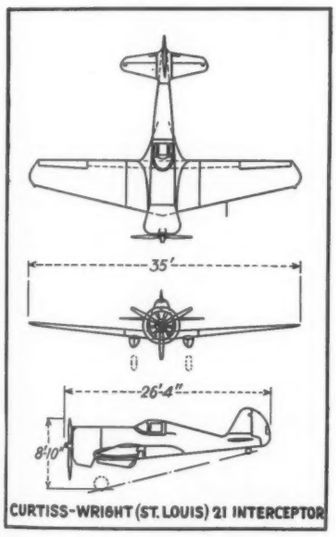
PERFORMANCE: High Speed 323 miles per hour at an altitude of 15,000 feet; cruising speed 262 miles per hour at an altitude of 15,000 feet. Stalling speed 69 miles per hour. Service ceiling 32,700 feet. The earlier Hawk 75, with fixed type landing gear, had the following performance figures: high speed 280 miles per hour at an altitude of 10,700 feet; cruising speed 240 miles per hour at an altitude of 10,700 feet. Rate of climb 2,340 feet per minute; cruising range of 1,210-1,380 miles.

CONSTRUCTION MATERIAL: Wing spars and ribs of the later model 75-A are of metal; Alclad covering material. It is equipped with a retractable type landing gear, hydraulic brakes; Curtiss Oleo landing gear shock unit, wheel type tail unit. Alclad, monocoque fuselage. This model is a low wing, single seat, all metal pursuit monoplane, and is available for domestic or export market.

CURTISS HAWK 75-A No A. T. C.

STANDARD EQUIPMENT: The Model 75-A is equipped with Curtiss Inconel exhaust manifold, Oleo shock absorbers, battery, landing lights, Pyrene or Kidde fire extinguishers, three double navigation lights, flares, radio shielding and bonding, Eclipse cartridge type or inertia starter, Bendix wheels and hydraulic brakes, Curtiss electric propeller and Lord instrument panel and engine mountings.

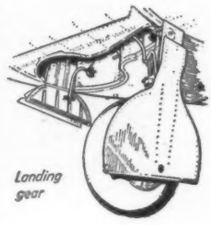
(For further specifications see table p. 115)



CURTISS-WRIGHT (ST. LOUIS) 21 INTERCEPTOR

SPECIFICATIONS: Span 35 ft., length overall 26 ft. 4 in., height overall 8 ft. 8 in., landing gear tread 107 in., wing loading 25.8 lb. per sq. ft., power loading 4.5 lb. per hp., weight empty 3,382 lb., gross weight 4,500 lb. It is powered by a Wright Cyclone engine. Total rated hp. 800 at 18,000 ft., and 1,000 at 5,600 ft., fuel capacity 100 gal., normal range 630 mi., fuel consumption at cruising speed 44.7 gal. per hr., propeller diameter 102 in., wing area (including ailerons) 174.3 sq. ft., aileron area (total) 11.90 sq. ft., fin area 8.06 sq. ft., rudder area 7.36 sq. ft., stabilizer area 16.98 sq. ft., total elevator area 8.58 sq. ft.

PERFORMANCE: High speed 333 m.p.h. at 18,000 ft., and 314 m.p.h. at 5,600 ft., cruising speed 282 m.p.h. at 12,200 ft., stalling speed 68 m.p.h., climb at sea level 4,350 ft. per min., service ceiling 34,300 ft.

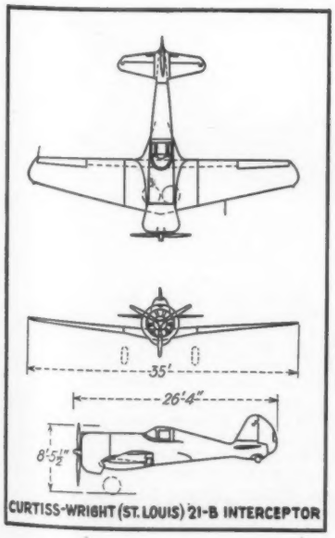

Landing gear

CONSTRUCTION MATERIAL: Wings have Alclad spars, Alclad ribs, Alclad covering material, retractable type landing gear, Goodyear wheel 27 in., Goodyear hydraulic brakes, Oleo-pneumatic landing gear and shock unit, wheel tail unit, aluminum alloy, riveted Alclad fuselage.

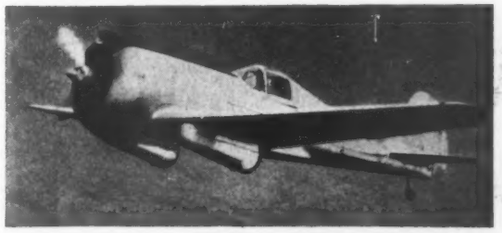
CURTISS-WRIGHT (St. Louis) Model No. 21-B, Interceptor

STANDARD EQUIPMENT: Instruments: Kollsman rate of climb, Kollsman compass, Kollsman tachometer, Kollsman eng. gage, Kollsman air speed indicator, Kollsman altimeter, Pioneer bank and turn, Kollsman manifold press, Weston cyl. temp. Radio: R.C.A. transmitter and R.C.A. receiver.

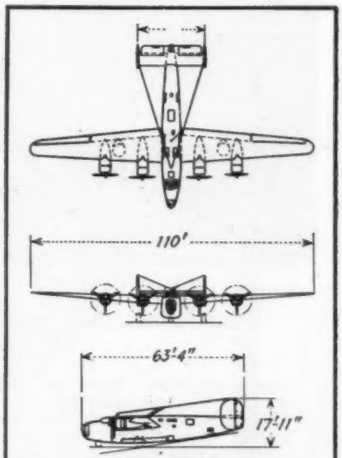
(For further specifications see table p. 115)



CURTISS-WRIGHT (ST. LOUIS) 21-B INTERCEPTOR

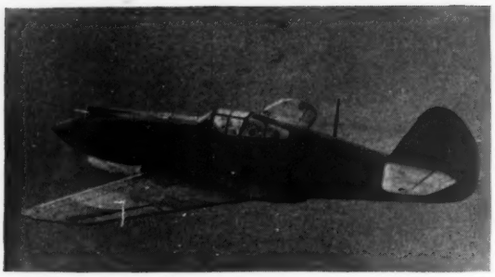

CURTISS-WRIGHT (St. Louis) Model No. 21

CONSOLIDATED Model 32



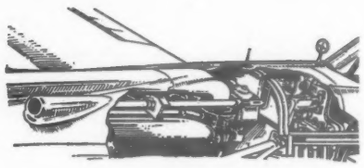
CONSOLIDATED LANDPLANE BOMBER 32

MILITARY



CURTISS Model HAWK 81-A

SPECIFICATIONS: Span 37.3 feet, length overall 31.7 feet, height overall 10.6 feet, wing loading 29.6 pounds per square foot, power loading 6.4 pounds per horsepower, weight empty 5,475 pounds, gross weight 6,978 pounds. This model is powered by an Allison engine. The total rated horsepower is 1,090 at an altitude of 15,000 feet. Fuel capacity is 160 gallons.

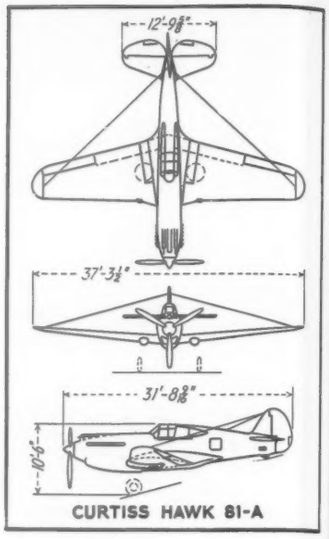


Gun Installation

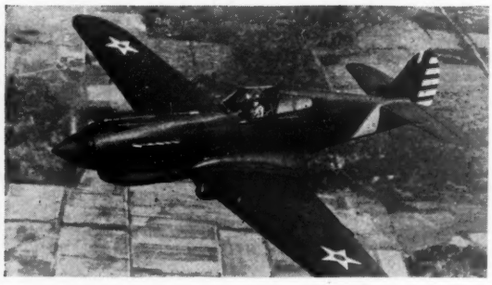
normal range 893 miles. The wing area (including ailerons) is 236 square feet, fin area 7.0 square feet, rudder area 13.7 square feet, stabilizer area 28.8 square feet, and area of total elevators is 19.2 square feet.

CONSTRUCTION MATERIAL: The wing spars of this model are constructed of metal, the ribs are of metal, and it has Alclad covering material. It is equipped with a retractable type landing gear, hydraulic brakes, Curtiss-Oleo landing gear shock unit, wheel tail unit, and monocoque type Alclad fuselage.

(For further specifications see p. 115)



CURTISS HAWK 81-A



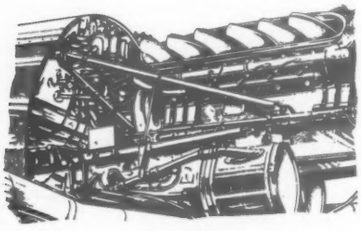
CURTISS Model P-40

SPECIFICATIONS: The span of this model is 37.3 feet, length overall 31.7 feet, height overall 10.6 feet. Wing loading 28.6 pounds per square feet, power loading 6.8 pounds per horsepower, weight empty 5,381 pounds, gross weight 6,789 pounds. The model is powered by an Allison engine. The total rated horsepower is 1,000 at 15,000 feet. Fuel capacity 120 gallons,

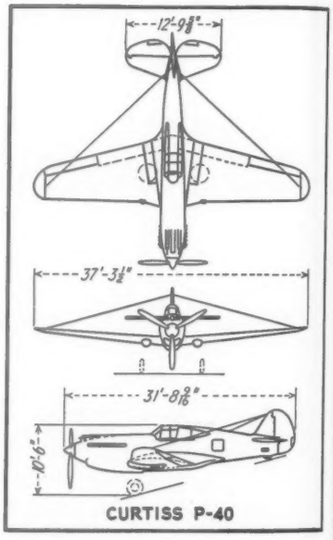
normal range 945 miles. The wing area (including ailerons) is 236 square feet, fin area 7.0 square feet, rudder area 13.7 square feet, stabilizer area 28.8 square feet, area of total elevators 19.2 square feet.

CONSTRUCTION MATERIAL: The wings of this model have spars made of metal, ribs made of metal and the covering material is of Alclad. It is equipped with a retractable type landing gear, hydraulic brakes, Curtiss-Oleo landing gear shock unit, wheel tail unit, and it has a monocoque type fuselage constructed of Alclad.

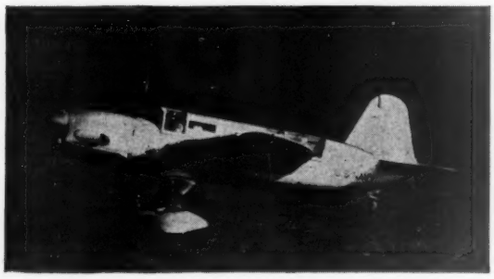
(For further specifications see p. 115)



Engine Mount

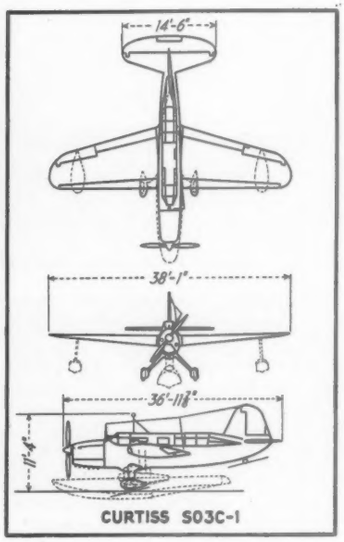


CURTISS P-40

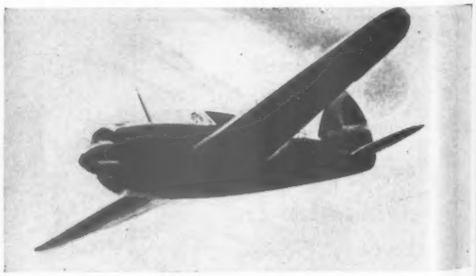


CURTISS-WRIGHT (Buffalo) SO3C-1

SPECIFICATIONS: Span 38 feet, length overall 36 ft. 9 in., height overall 15 ft. Wing loading 19.7 pounds per square foot, power loading 12.7 pounds per square foot, weight empty 4284 pounds, gross weight 5729 pounds. This model is powered by a Ranger inverted engine, total rated horsepower 520. Fuel capacity 199 gallons. Wing area (including ailerons) 290 square feet, fin area 13.9 square feet, rudder area 13.1 sq. ft.



CURTISS SO3C-1



BREWSTER Model 340

SPECIFICATIONS: Span 47 ft., overall length 39½ ft., height overall 15¼ ft. It is powered by a Wright Cyclone engine of 1500 hp.

STANDARD EQUIPMENT: Kollsman, Sperry, Pioneer, Elgin, Weld & Kiddy, Asco instruments, Bendix shock mountings, General tires, Hayes brakes, Curtiss propeller, Bendix seats, Arens controls, Torrington bearings, Oleo shock strut, Mazda lights. Radio: Model G F series.

(For further specifications see p. 115)

Early Bleriot monoplane —1911

From Bleriot to B-26's

Martin B-26 bomber—1941

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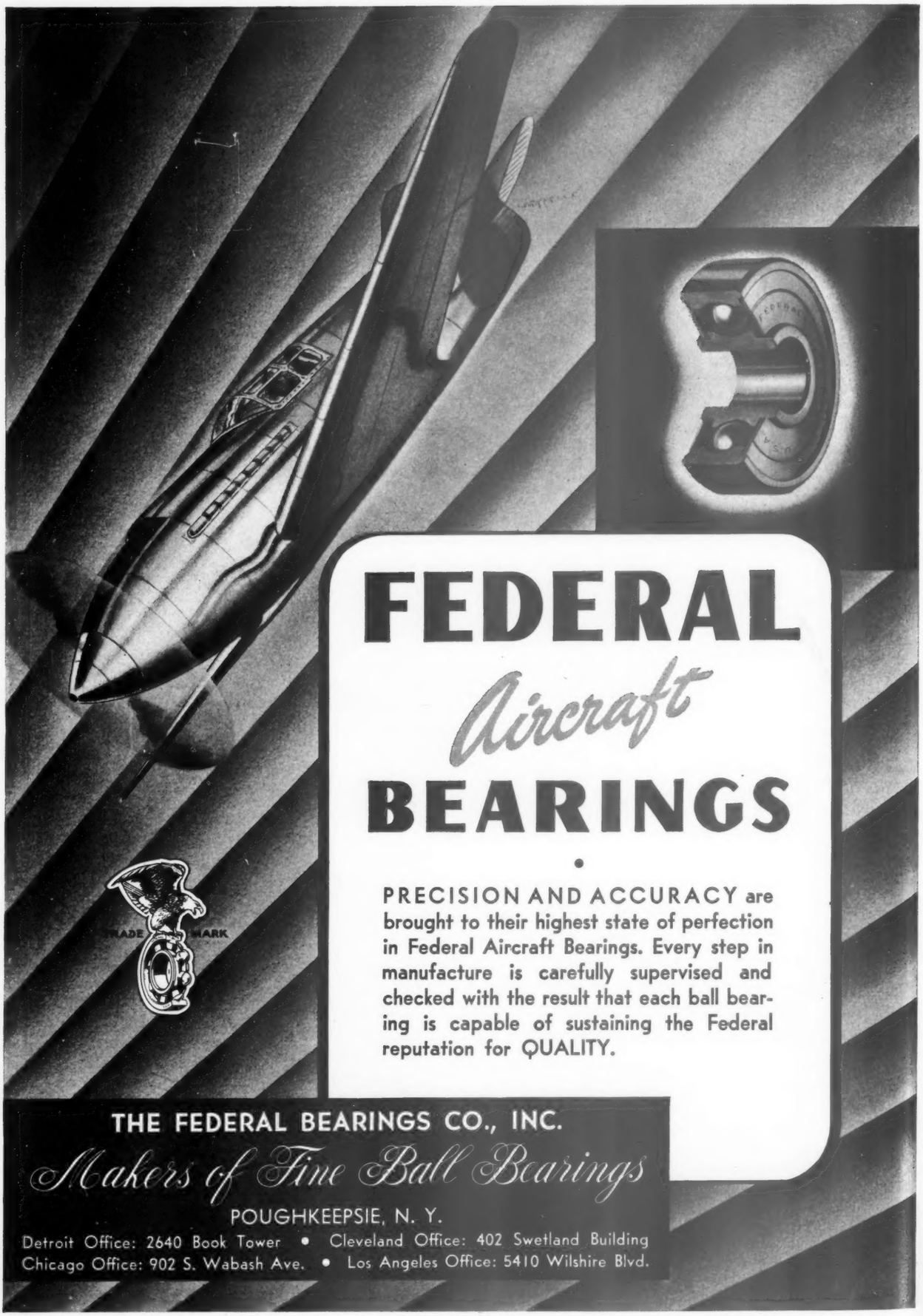

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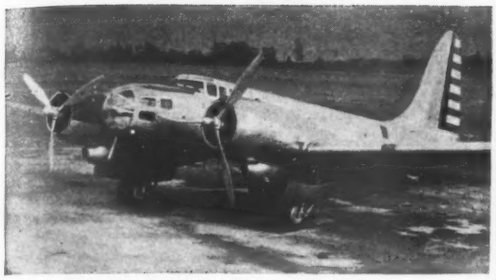
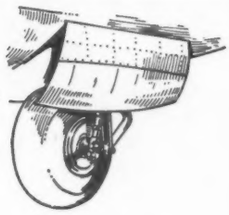
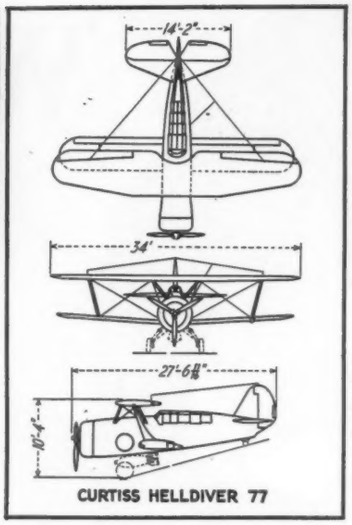


DOUGLAS B-23



Landing Gear

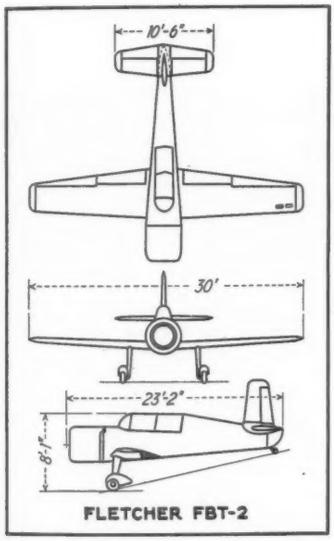


CURTISS HELLDIVER 77

CURTISS Model Helldiver-77

SPECIFICATIONS: Span 34 feet, overall length 27 feet 5 inches, overall height 10 feet 4 inches, wing loading 19.7 pounds per square foot, power loading 6.6 pounds per horse power, weight empty 4,548, gross weight 6,256 pounds, powered by a two-row Wright Cyclone engine, total rated horse power 950 at an altitude of 15,200 feet, fuel capacity 135 gallons, range 855 miles.

(For further specifications see p. 115)



FLETCHER FBT-2

SPECIFICATIONS: Span 30 feet, overall length 23.2 feet, overall height 8.1 feet. The landing gear tread is 101 inches, wing loading 20.0 pounds per square foot, power loading 8.75 pounds per horsepower, weight empty 1,740, gross weight 2,500 pounds. It is powered by a Wright engine, with total rated horsepower 285 at sea level, fuel capacity 50 gallons, normal range 540 miles, fuel consumption at cruising speed 14 gallons per hour, diameter of propeller 7 feet 10 inches, wing area (including ailerons) 125 square feet, total area of ailerons 11.4 square feet, fin area 8.9 square feet, rudder area 4.1 square feet, stabilizer area 17.8 square feet, area of total elevators 8.2 square feet. Seats two.

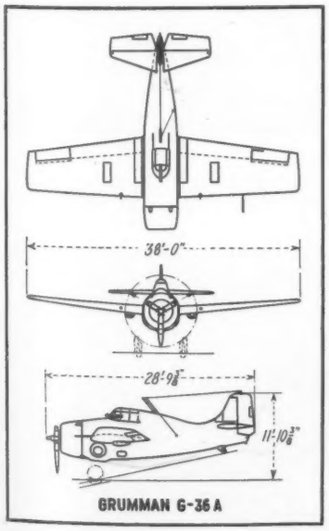
PERFORMANCE: High speed 175 miles per hour at sea level, cruising speed 150 miles per hour at sea level, stalling speed 60 miles per hour, climb at sea level 1,340 feet per minute, service ceiling 19,000 feet.

Cockpit Enclosure

FLETCHER Model FBT-2

CONSTRUCTION MATERIAL: Spruce wing spars, spruce ribs, plywood covering. It is equipped with fixed type of landing gear, Firestone wheels 8.00 x 6, Firestone hydraulic brakes, air and Oleo landing gear shock unit, wheel tail unit monocoque plywood fuselage.

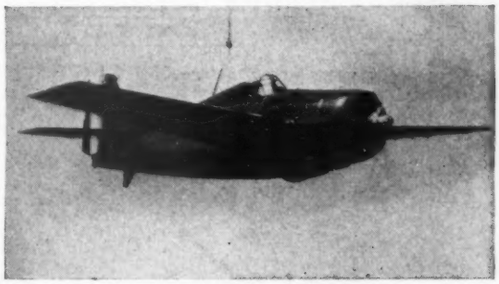
(For further specifications see p. 115)



GRUMMAN G-36A

SPECIFICATIONS: Span 38 ft., overall length 28 ft. 10 in., overall height 9 ft. 2½ in. It is powered by a Wright Cyclone engine. Total rated hp. 1,200 at take-off. Wing area (including ailerons) 260 sq. ft., aileron area (total) 11.48 sq. ft., fin area 13.2 sq. ft., rudder area 9.38 sq. ft., stabilizer area 30.43 sq. ft., total elevator area 18.6 sq. ft. In addition to this and the model JRF-2 military amphibian Grumman builds a military amphibian model G21B whose specifications are: span 49 ft., overall length 38 ft. 4 in., overall height 12 ft., landing gear tread 90⅝ in. Wing loading 21.3 lb. per sq. ft., power loading 8.9 lb. per hp., weight empty 5,425 lb., gross weight 8,000 lb. It is powered by 2 Pratt & Whitney Wasp Jrs., total rated hp. 800 at 5,000 ft. Fuel capacity 220 gallons, normal range 800 miles. Propeller diameter 102 in. Wing area (including ailerons) 375 sq. ft., aileron area (total) 22.5 sq. ft., fin area 26.7 sq. ft., rudder area 21 sq. ft., stabilizer area 44.8 sq. ft., total elevator area 31.2 sq. ft.

CONSTRUCTION MATERIAL: Wings of the G-36A have aluminum alloy spars, aluminum alloy ribs, metal covering. Retractable landing gear, 26 x 6 wheel, hydraulic brakes, Bendix Oleo landing gear and shock unit, wheel tail unit, aluminum alloy monocoque fuselage.



GRUMMAN Model No. G-36A

STANDARD EQUIPMENT: Complete set of flight and engine instruments, Lord shock mountings, Goodrich tires, Hayes brakes, Hamilton Hydromatic propeller, Bendix seats, Bendix shock strut, Grimes lights. Provision is made for a two-way radio.

(For further specifications see p. 115)

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RIGID SURFACE INSPECTION of every piece of Carilloy Alloy Steel, as practiced at our mills. Specially trained inspectors are used in this work.

MICROSCOPIC EXAMINATION—microstructural features are checked with special r gard for aircraft requirement.

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THIS "AC"—Aircraft Quality—stamp goes only on those U·S·S Carilloy Alloy Steels that measure up to the high requirement of aircraft manufacture.

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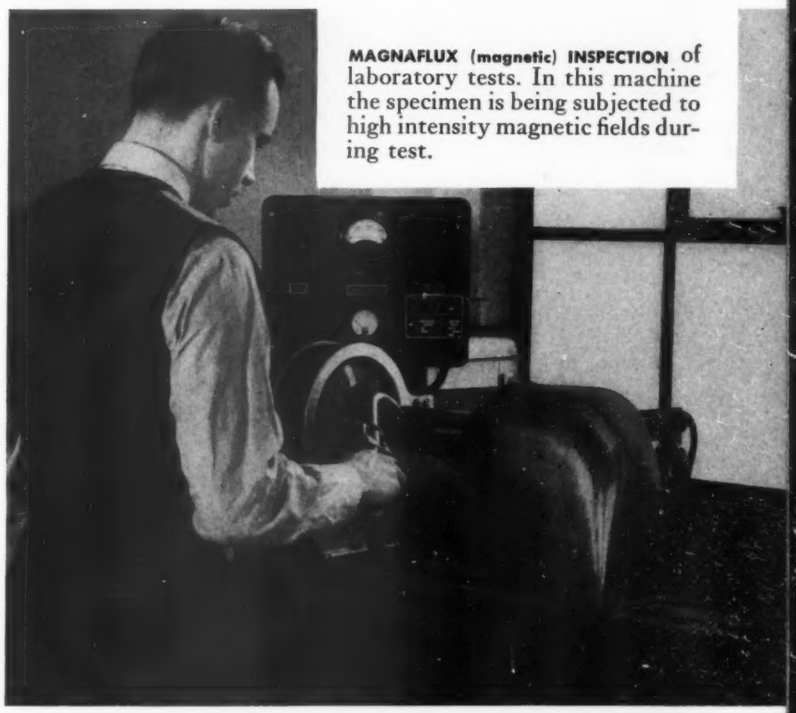

MAGNAFLUX (magnetic) INSPECTION of laboratory tests. In this machine the specimen is being subjected to high intensity magnetic fields during test.

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UNITED STATES STEEL

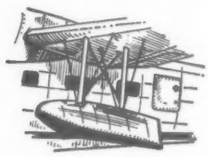
GRUMMAN Model No. JRF-2

SPECIFICATIONS: Span 49 ft., length overall 38 ft. 4 in., height overall 12 ft., landing gear tread 90⅜ in., wing loading 21.3 lb. per sq. ft., power loading 8.9 lb. per hp., weight empty 5,530 lb., gross weight 7,955 lb. It is powered by a P. & W. Wasp Jr. Total rated hp. 800 at 5,000 feet, fuel capacity 220 gal., normal range 1,000 mi., propeller diameter 162 in., wing area (including ailerons) 375 sq. ft., aileron area (total) 22.5 sq. ft., fin area 26.3 sq. ft., rudder area 21 sq. ft., stabilizer area 44.8 sq. ft., total elevator area 31.2 sq. ft. Instruments have Lord mountings. Seats eight.

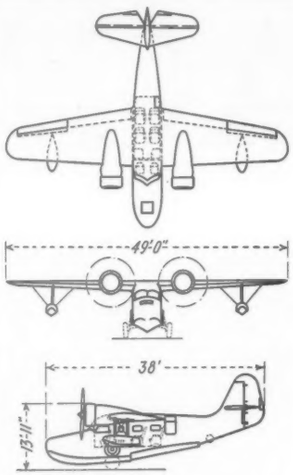
PERFORMANCE: High speed 200 m.p.h. at 5,000 ft., cruising speed 190 m.p.h. at 9,600 ft., stalling speed 65 m.p.h., climb at sea level 1,300 ft. per min., service ceiling 22,000 ft.

CONSTRUCTION MATERIAL: Wings have aluminum alloy box spars, aluminum alloy ribs, metal covering material, retractable type landing gear, Hayes wheel 30 x 7, Hayes hydraulic brakes, Bendix-Oleo landing gear and shock unit, wheel tail unit, aluminum alloy monocoque fuselage.

(For further specifications see table p. 115)



Wing Float



GRUMMAN JRF-2 AMPHIBIAN

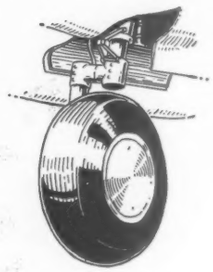
GLENN L. MARTIN Model 167-W

SPECIFICATIONS: Span 61 ft. 4 in., overall length 46 ft. 8 in., overall height 10 ft., landing gear tread 195 in., wing loading 28.4 lb. per sq. ft., power loading 8.5 lb. per hp., weight empty 10,586, gross weight 15,297 lb., powered by 2 Pratt & Whitney Twin Wasp engines, total rated hp. 2,100 at an altitude of 7,100 ft., fuel capacity 760 gallons, normal range 2,470 miles, diameter of propeller 132 in., wing area (including ailerons) 538.5 sq. ft., total aileron area 47.5 sq. ft., fin area 18.87 sq. ft., rudder area 23.89 sq. ft., stabilizer area 73.56 sq. ft., total elevator area 42.6 sq. ft. Seats three.

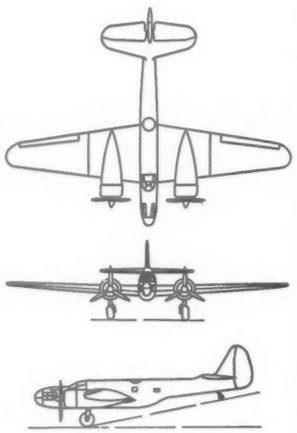
PERFORMANCE: High speed 310 miles per hour, at an altitude of 14,000 feet, cruising speed 248 miles per hour, stalling speed 69 miles per hour, climb at sea level 1,790 feet per minute, service ceiling 31,500 feet.

CONSTRUCTION MATERIAL: Aluminum alloy wing spars, aluminum alloy ribs, aluminum alloy covering material, retractable type of landing gear, wheel size 39 in., smooth contour, hydraulic brakes, Oleo landing gear shock unit, wheel tail unit, aluminum alloy riveted fuselage.

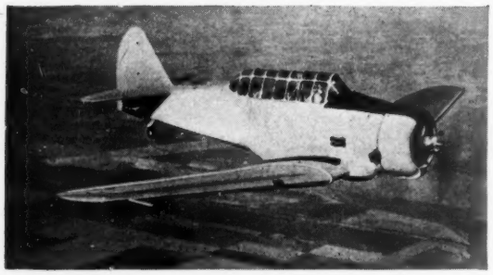
(For further specifications see table p. 115)



Landing Gear



MARTIN 167-W



NORTH AMERICAN Model NA-16-3

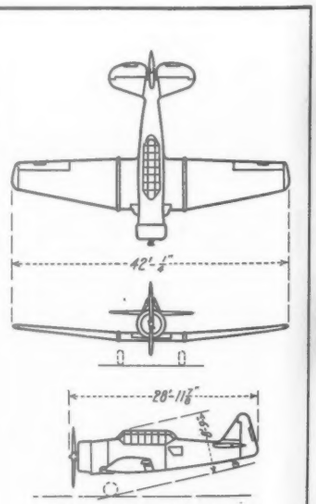
SPECIFICATIONS: Span 42 feet ¼ inch, length overall 28 ft. 11⅞ in., height overall 8 ft. 9 in., landing gear tread 115½ inches. Wing loading 20.73 pounds per square foot, power loading 9.56 pounds per horse power, weight empty 3,958 pounds, gross weight 5,260 pounds. It is powered by a Pratt & Whitney Wasp engine. Total rated horse power 550 at 5,000 feet, fuel capacity 111 gallons, normal range 730 miles, fuel consumption at cruising speed 23.5 gallons per hour, propeller diameter 108 inches. Wing area (including ailerons) 253.73 square feet, aileron area (total) 22.80 square feet, fin area 5.33 square feet, rudder area 13.21 square feet, stabilizer area 28.34 square feet, total elevator area 21.76 square feet. Seats two.

PERFORMANCE: High speed 206 miles per hour at 5,000 feet, cruising speed 180 miles per hour at 12,000 feet, stalling speed 66 miles per hour, climbs at sea level 1,350 feet per minute, service ceiling 23,000 feet.

CONSTRUCTION MATERIAL: Wings have aluminum alloy spars, aluminum alloy ribs, Alclad covering material. Retractable landing gear, 27 inch steel closed wheel, hydraulic brakes, Aerol landing gear shock unit, wheel tail unit.

(For further specifications see table p. 115)

Turnover Bulkhead



NORTH AMERICAN NA-16-3

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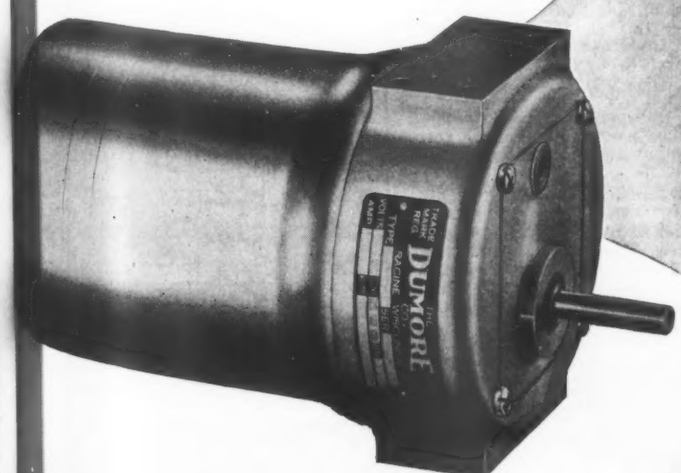

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SPECIFICATIONS TYPE E1-Y AIRCRAFT MOTOR

Series reversible, 12 or 24 volts D. C.; H. P. range, 1/14 to 1/20; full-load speeds, 1,600 to 200 R. P. M.; watts input, 120; duty, 10-minute; totally enclosed; weight, 3 lbs.; all screws safety-wired. (This motor was designed and built especially for aircraft use.)

MILITARY

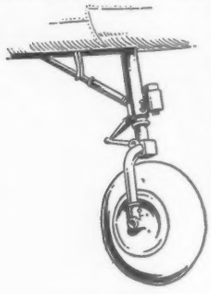
NORTH AMERICAN Model NA-40A

SPECIFICATIONS: Span 67 ft. 6 in., overall length 51 ft. 5 in., overall height 14. ft. 10½ in., landing gear tread 232 in., wing loading 39.33 lb. per sq. ft., power loading 7.50 lb. per hp., weight empty 16,000, gross weight 24,000 lb., powered by 2 Wright Cyclone engines with total rated hp. 2,500 at an altitude of 12,000 ft., fuel capacity 916 gallons, normal range 1,728 miles, fuel consumption at cruising speed 133 gallons per hour, diameter of propeller 150 in., wing area (including ailerons) 610.1 sq. ft., total aileron area 32.3 sq. ft., fin area 40.8 sq. ft., rudder area 35.6 sq. ft., stabilizer area 92 sq. ft., total elevators 46 sq. ft. Seats five.

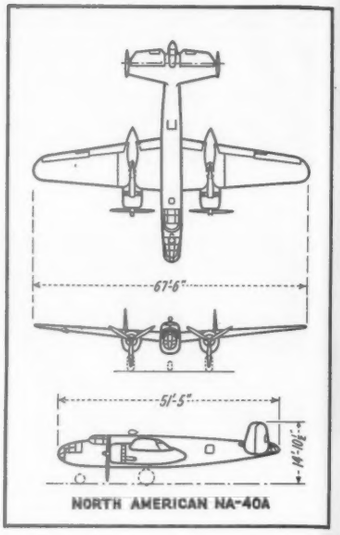
PERFORMANCE: High speed 308 m.p.h., at an altitude of 13,000 ft., cruising speed 259 m.p.h., at an altitude of 10,500 ft., stalling speed 85 m.p.h., climb at sea level 1,880 ft. per minute, service ceiling 25,400 ft.

CONSTRUCTION MATERIAL: Aluminum alloy wing spars, aluminum alloy ribs, Alclad covering material, 47 in. wheels, retractable tricycle type landing gear, emergency tail skid hydraulic brakes, monocoque Alclad fuselage.

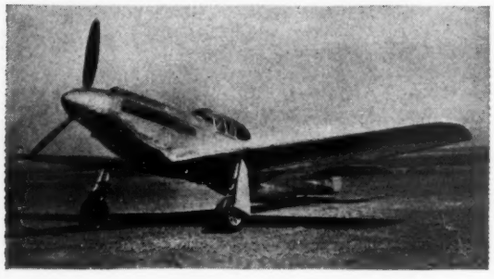
(For further specifications see table p. 115)



Nose Wheel



NORTH AMERICAN NA-40A



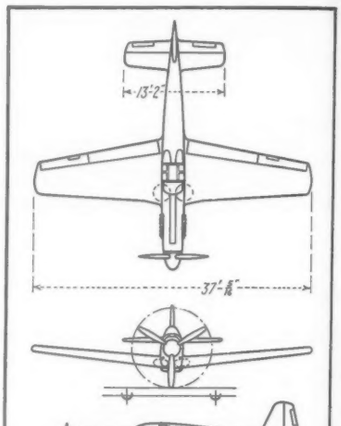
NORTH AMERICAN Model NA-73

SPECIFICATIONS: Span is 37 feet $\frac{4}{16}$ inches, overall length 32 feet $2\frac{4}{16}$ inches, overall height 104 inches, the landing gear tread 141 inches, wing loading 32.6 pounds per square foot, power loading 7.34 pounds per horse power, weight empty 5,990 pounds, gross weight 7,708. It is powered by an Allison engine, total rated horse power 960 at an altitude of 12,000 feet. Fuel capacity 105 gallons, normal range 640 miles, fuel consumption at cruising speed 48.3 gallons per hour. The propeller measures 126 inches in diameter. Wing area (including ailerons) 235.95 square feet, total aileron area 16.6 square feet, fin area 10.07 square feet, rudder area 10.80 square feet, stabilizer area, 28.04 square feet, total elevator area 16.46 square feet. Seats one.

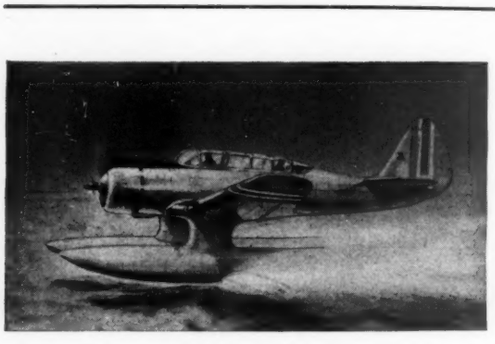
CONSTRUCTION MATERIAL: Aluminum alloy wing spars and ribs, covering material of Alclad. The landing gear is of retractable type, wheels are 27 inches of steel closed type, hydraulic brakes, Aerol landing gear shock unit, Alclad monocoque fuselage.

(For further specifications see table p. 115)

Landing Gear



NORTH AMERICAN NA-73



NORTHROP Model N-3PB

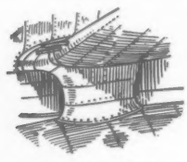
SPECIFICATIONS: Span 48 feet 11 inches, overall length 38 feet, overall height 16 feet 10 inches, landing gear tread 11 feet 2 inches, wing loading 22½ pounds per square foot, power loading 8.95 pounds per horse power, weight empty 6,151 pounds, gross weight 8,500 pounds, powered by a Wright G-200 engine, total rated horse power 1,200 at sea level, fuel capacity 320 gallons, normal range 1,165 miles, fuel consumption at cruising speed 38½ gallons per hour, diameter of propeller 126 inches, wing area (including ailerons) 377 square feet, total aileron area 24 square feet, fin area 12.7 square feet, rudder area 25.4 square feet, stabilizer area 35.6 square feet, total elevator area 34.4 square feet.

PERFORMANCE: High speed 217 miles per hour, at an altitude of 16,400 feet, cruising speed 150 miles per hour at an altitude of 5,000 feet, stalling speed 65 miles per hour, climb at sea level 1,280 feet per minute, service ceiling 24,000 feet. Seats three.

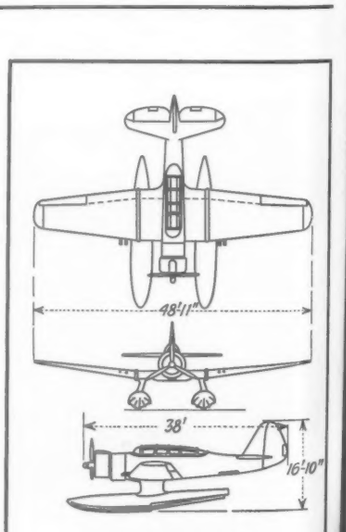
CONSTRUCTION MATERIAL: Alclad wing spars, Alclad ribs, Alclad covering.

STANDARD EQUIPMENT: Kollsman, Weston, and Pioneer instruments, Edo floats, Hamilton Standard propeller, Bendix seats, Lear radio.

(For further specifications see table p. 115)



Pontoon Strut



NORTHROP N-3PB

THE 1941 75-hp. SILVAIRE

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★ Scores of America's most experienced C.P.T.P. operators are training many of America's future defense pilots in modern metal Luscombe airplanes exclusively. They find that students who have been trained in these more maneuverable, stronger, all-metal airplanes, make the transition to the secondary stage more easily. Their operation costs are comparable to or less than those submitted by operators of lower powered conventional equipment. Their students appreciate the value of training in airplanes built of metal like the fighters and bombers they may some day be required to fly in defense of our shores.

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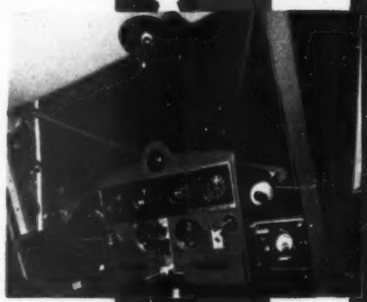

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The Birdmen's Perch

How about those Funnyboners? I want to hear more about those mistakes you made while learning to fly. Send 'em in, pals—here's your chance to confess and tell us why your instructor's hair turned white over night.

Major Al Williams, alias "Tattered Wing-Tips," Mgr., Gulf Aviation Products, Gulf Building, Pittsburgh, Pa.

FUNNYBONER DEPARTMENT

Here's a boner I pulled while learning to fly:

I'd had about 2 or 3 hours' dual instruction and was practicing landings with my instructor. I'd completed several pretty good ones and was approaching the runway for another, when the instructor took over the controls.

I thought he intended to keep the controls—and he thought I'd take them right back again. The result was a very bumpy, but successful landing, with nobody at the controls at all!

Winton Smith, Mamaroneck, N. Y.

DON'T TRY THIS ONE IN YOUR BATH TUB!

The hot water tap on a bathtub will fill it in 4 minutes. The cold water faucet

will fill it in 6 minutes. And the drain in the bottom of the tub will empty it in 8 minutes.

With the drain open and both cold and hot water taps on, how long will it take to fill the tub?

YOU'D BE SURPRISED HOW YOU CAN CLEAN UP

If you remember your high school chemistry, you'll recall that one of the first things you were taught was how to use a filter paper.

Probably one of your first experiments was when you took a cloudy, muddy solution and filtered it through a rough filter paper. You found that the solution came through crystal clear, and that the filter paper was stained dark by the residue.

But then, even though your filtrate was crystal clear, you again filtered it, this time through a finer paper. And this time, though the appearance of the solution was just as clear as before, you found to your surprise, that a fine residue had been left behind on the filter paper. You'd made your solution even purer than you thought possible.

You might remember this experiment the next time you're buying oil for your plane. For though many oils look exactly alike, you'd be surprised how much extra impurity you can sometimes get out of them.

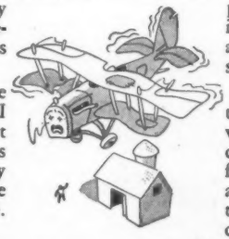
We know, because we refine Gulfpride by means of a special process—the Alchlor Process. And tests have shown that this Alchlor Process removes up to 20% more of the carbon and sludge formers found in oil!

Yes, we know that by taking the extra time and trouble, we can get a lot of *extra* impurities out of oil. That's why Gulfpride is the finest oil you can put into your motor!

THIS MONTH'S WHOPPER (4 Stars)

Dear Major:

I had an old Jenny once, and for the last few years she's been setting out in my barn. Sorta hated to junk her because we'd had some good times together, Jenny and me.



I was thinking about that the other day—about getting old, I mean—when I spied a story about G.A.G. Well, it looked like this was just the medicine my Jenny needed. So I hauled her out of the barn and filled her up with G.A.G. And then the trouble began.

Say, I didn't hardly have time to get out of the way before little Jenny perked right up and the next thing I know she's circling over the barn and heading off towards the city.

All day long I waited pacing up and down the barn floor, and it was long about sundown when I heard a funny kind of sputtering and there comes Jenny.

Gosh, Major, that ship looked like it had met a couple of hurricanes with a tornado in the middle and when I got her back into the barn and kind of got over being so scared I says to her:

"Jenny, I allus said you was a well-behaved little ship. And you was. Now, where've you been all day?" And Jenny looked at me kind of reproachful like and she says: "Say, Pop, who fed me that G.A.G. anyway?"

"Well," I says, "that don't answer my question. All by yourself you took off and all by yourself you spent all day in the city and all by yourself you come back again. Now what's the story?"

Well, this is Jenny's story:—"Pop, I met an Army Bomber—the handsomest Army Bomber! His approach was perfect. He wiggled his ailerons rather flirtatiously and I wiggled mine back. If it hadn't been for that G.A.G. I'd have been more of a lady!

"We glided along together—even had a couple of wing-overs. Then—then—well he settled down on a soft cushion of air and flipped his flippers invitingly. Pop, can you imagine how I felt? A dashing Army Bomber flipping his flippers at me, an old Jenny! And honestly, Pop, I'd reached the burble point so to speak. I felt like making a power dive for him, but I restrained myself and instead I just settled down too.

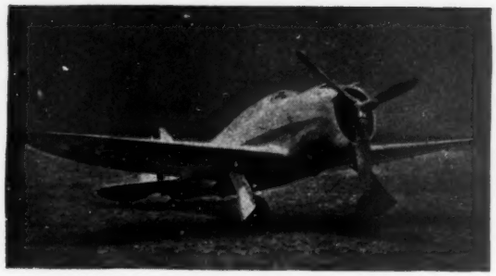
"Talk about speed, Pop! They must use G.A.G. in the army too. I'm afraid I completely forgot my excellent training, because after a bit of stalling around I—well—I'm afraid I skidded a little.

"And I don't care if I *am* a bit the worse for wear. Although my wings are a trifle tarnished and I can't hold my nose as high as before; although my struts and spars aren't what they once were; although my landing gear has collapsed and my shock absorbers were shocked off; although my motor is dead and my prop won't go 'round; I still say: More power to G.A.G.!" **D. D.**

P. S. G.A.G. don't *need* no more power!

Gulf Oil Corporation and Gulf Refining Company . . . makers of

GULF **GULF AVIATION PRODUCTS**

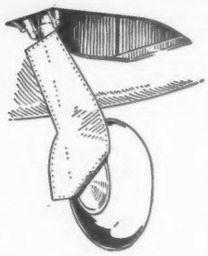


REPUBLIC Lancer P-43

SPECIFICATIONS: Span 36 ft., overall length 28 ft. 5¾ in., overall height 10 ft. 2⅛ in., landing gear tread 9 ft. 2¼ in., wing loading 32.1 lb. per sq. ft., power loading 5.96 lb. per hp., weight empty 5,478, gross weight 7,155 lb., powered by P. & W. Twin Wasp, total rated hp. 1,200 at an altitude of 23,000 ft., fuel capacity 145 gallons, normal range 520 miles, diameter of propeller 11 ft., wing area (including ailerons) 223.7 sq. ft., total aileron area 19.5 sq. ft., fin area 10.1 sq. ft., rudder area 9.5 sq. ft., stabilizer area 19.2 sq. ft., total elevator area 15.9 sq. ft.

PERFORMANCE: High speed 375. at an altitude of 23,000 ft., cruising speed 325 m.p.h., at an altitude of 23,000 ft., stalling speed 86 m.p.h., climb at sea level 3,380 ft. per minute.

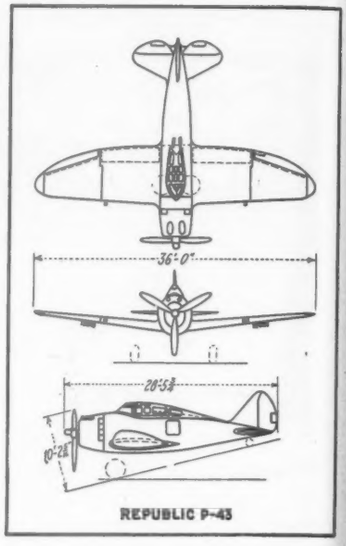
CONSTRUCTION MATERIAL: Aluminum alloy wing spars, aluminum alloy ribs, Alclad covering material, retractable type of landing gear, 30 in. smooth contour wheel, hydraulic brakes, Oleo-pn. shock struts, aluminum alloy and Alclad fuselage.



Landing Gear

STANDARD EQUIPMENT: Airspeed, altimeter, compass, air thermometer, tachometer, manifold press, gage, thermocouple, suction gage, clock, bank and turn, climb, flight, fuel level, landing gear and flap indicator, hydr. pressure gage, Lord instrument mountings.

(For further specifications see p. 115)



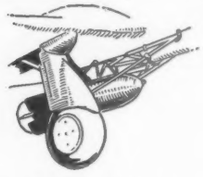
REPUBLIC P-43

REPUBLIC 2PA

SPECIFICATIONS: Span 41 ft., overall length 27 ft., 8 in., overall height 9 ft. 9½ in., landing gear tread 7 ft. 10 in., wing loading 30 lb. per sq. ft., power loading 7.12 lb. per hp., weight empty 5,146 pounds, gross weight 7,480 pounds. It is powered by a Pratt & Whitney Twin Wasp engine, total rated horse power 1050 at an altitude of 11,500 feet. Fuel capacity 200 gallons, range 580 miles, diameter of propeller 10 feet 6 inches, wing area (including ailerons) 250 square feet, total aileron area 22 square feet, fin area 10.17 square feet, rudder area 9.61 square feet, stabilizer area 23.4 square feet, total elevator area 20.9 square feet.

PERFORMANCE: High speed 293 miles per hour, at an altitude of 11,500 feet, cruising speed 250 miles per hour at 15,000 feet, stalling speed 86 miles per hour, climb 2,050 at sea level, service ceiling 28,000 feet.

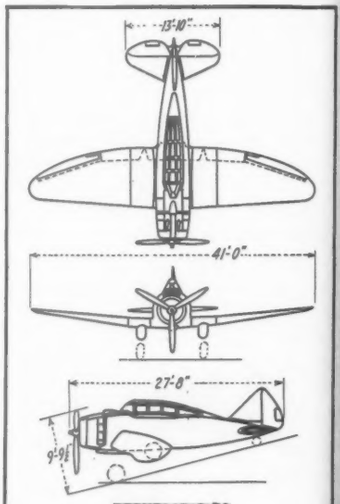
CONSTRUCTION MATERIAL: Aluminum alloy wing spars, aluminum alloy ribs, Alclad covering, 27 in. smooth contour wheel, hydraulic brakes, Oleo landing gear shock unit, retractable tail unit.



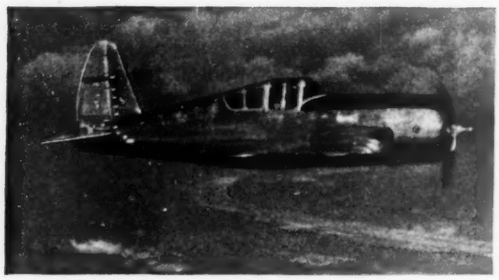
Bomb Carriage

STANDARD EQUIPMENT: Airspeed, altimeter, tachometer, temperature indicator, fuel level, manifold press. and suction gage, climb, bank, turn indicators.

(For further specifications see p. 115)



REPUBLIC 2-PA



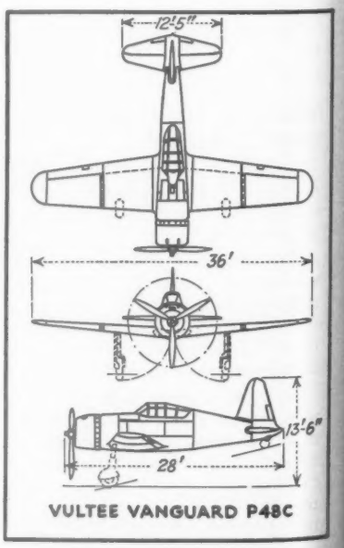
VULTEE Vanguard P-48c

SPECIFICATIONS: Span 36 feet, overall length 28 feet, overall height 9 feet 5 inches, landing gear tread 160 inches, weight empty 5,841, gross weight 6,182 pounds, powered by a Pratt & Whitney Twin Wasp engine, total rated horse power 1,200 at an altitude of 4,900 feet. fuel capacity 240 gallons, normal range 700 miles, area of wing (including ailerons) 197 square feet. Specifications for Vultee 54 Valiant (pg. 96) are: span 42 feet, overall length 28 feet 7 inches, overall height 9 feet 1 inch, landing gear tread 128 inches, weight empty 2,976, gross weight 3,991 pounds, powered by a Pratt & Whitney Wasp Junior, with total rated horse power 450 at sea level, fuel capacity 92 gallons, normal range 730 miles, area of wing (including ailerons) 239 square feet.

PERFORMANCE: High speed 340 miles per hour, at an altitude of 6,900 feet, cruising speed 290 miles per hour at an altitude of 16,000 feet, service ceiling 33,000 feet. Performance for the Vultee 54 Valiant (see pg. 96) is: high speed 182 miles per hour at sea level, cruising speed 170 miles per hour at an altitude of 5,000 feet, service ceiling 21,000 feet.

CONSTRUCTION MATERIAL: Welded steel tubing semi-monocoque fuselage.

(For further specifications see p. 115)

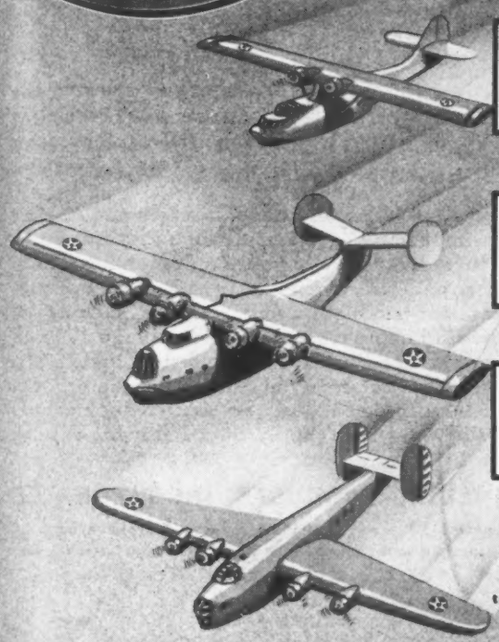


VULTEE VANGUARD P48C

13'-6"

y, 1941

A VETERAN OF DEFENSE PRODUCTION



PBY series
PB2Y series
B24 series

"Production for defense" is not new to Consolidated Aircraft Corporation. Many hundreds of huge Consolidated airplanes are already in the armed service of the nation.

Many hundreds more are under construction and are being delivered with increasing rapidity.

Specialists in the development of giant patrol bombers for land and sea*, Consolidated has built more than four times as many of this size multi-motored ship than any other builder!

* Ships having a wing span of over 100 feet.

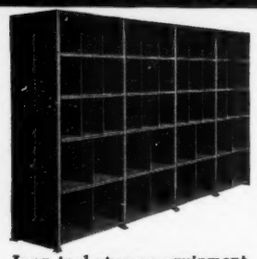
CONSOLIDATED *Aircraft* **CORPORATION**

ESTABLISHED 1923

SAN DIEGO, CALIFORNIA

LYON *Can Help You* "DO THE IMPOSSIBLE"

STOCK ROOMS



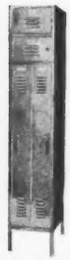
Lyon tool storage equipment solves the most complex tool storage problems. Protects tools. Saves floor space. Reduces tool handling delays. Maximum availability with a a minimum tool inventory.

TOOL ROOMS

Lyon adjustable storage shelving insures fast, economical handling of stock and parts. Reduces fire hazards and conserves floor space.

EMPLOYEE CLOTHES STORAGE

Lyon Shoprobe: (Patent No. 2-202-427). Minimum initial cost per person accommodated. Readily moved. Saves floor space—20 persons in each 12-½ sq. ft.



2-Person Lockers: Individual compartments for two people in area ordinarily occupied by single-occupancy lockers.

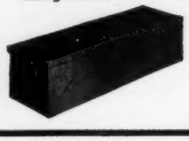
7-Person Lockers: Accommodate seven individuals in floor space of 36" x 20". Individual keys for small compartments all operate large coat compartment.

PRODUCTION AND ASSEMBLY LINES

Steel Benches: Cost less to buy than to build.

Assembler's Bench Bin: (Patent Applied For). A dozen parts in easy reach. Occupies only 1 square foot of bench space.

Shop Boxes: Types to meet any parts handling need.



Tool Stands: Bring tools to the job. Saves steps.

Bench Legs: Extra heavy for durability. Riveted and welded for rigidity. Economical.

Here's How Manufacturers Everywhere are Increasing Productive Floor Space and Stepping Up Production WITHOUT WAITING FOR NEW BUILDINGS, MACHINES OR TOOLS

In these days when industrial leaders are asking for the "impossible"... and expecting plant executives to deliver it... Lyon Equipment can help solve many of the problems involved. It contributes to faster production and releases floor space by providing compact, convenient storage... and fast, smooth handling... of materials and tools. And—most important—you can have these production-accelerating, space-saving, cost-reducing aids NOW. Ask your mill supply distributor for details, or write Lyon for catalogs.

LYON METAL PRODUCTS, INCORPORATED

General Offices: 5802 Madison Avenue, Aurora, Illinois

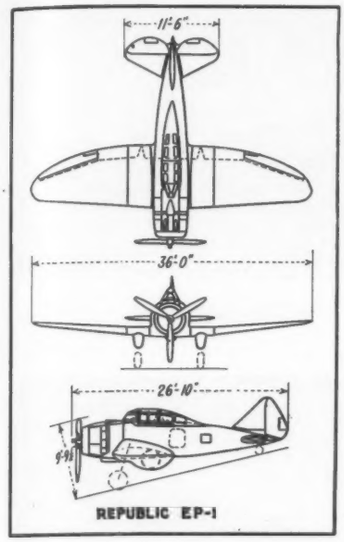
Branches and Distributors in All Principal Cities

FLASH!

When you find a way to swing production into high gear by using Lyon Equipment, you can capitalize the advantage AT ONCE. Lyon shop and storage equipment is carried in stock for immediate shipment. Most orders are in transit within hours of their receipt at our plants and warehouses.

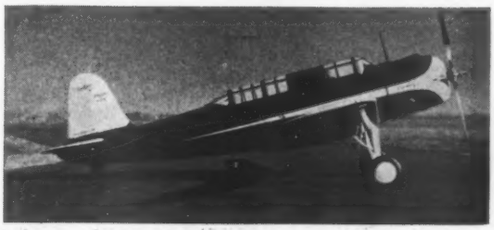
Catalogs illustrated below describe the complete Lyon line. Both your plant superintendent and purchasing agent should have these catalogs. Write today.

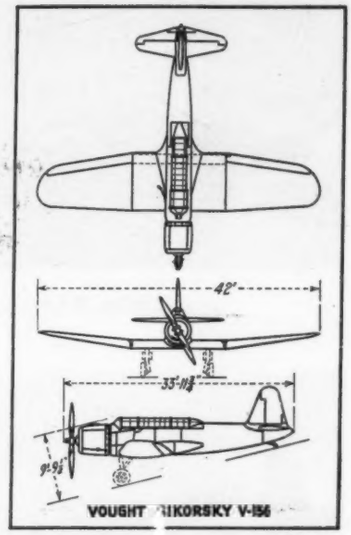
LYON *Service*
STORAGE EQUIPMENT



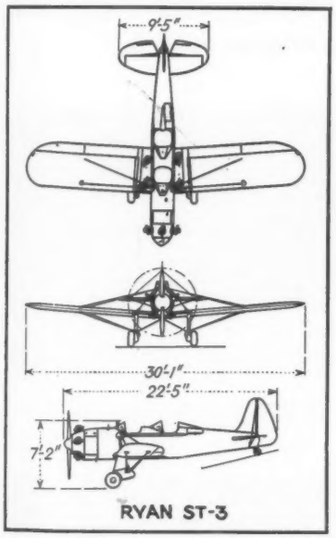
REPUBLIC EP-1

REPUBLIC Model P-35A (EP-1)


VOUGHT-SIKORSKY Model V-156



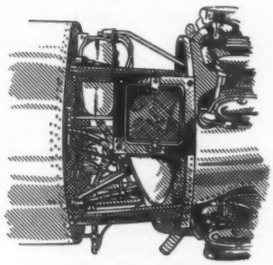
VOUGHT SIKORSKY V-156



RYAN ST-3

SPECIFICATIONS: Span 30 feet 1 inch, length overall 23 feet 3 inches, height overall 6 feet 10 inches. Landing gear tread 78¾ inches. Wing loading 13.6 pounds per square foot, power loading 12.2 pounds per horsepower, weight empty 1240 pounds, gross weight 1925 pounds. It is powered by both Menasco and Kinner engines. Total rated horsepower with Kinner engine is 160 at sea level. Fuel capacity 24 gallons. Normal range 266 miles. Propeller diameter 90 inches. Wing area (including ailerons) 134.3 square feet.

PERFORMANCE: High speed 129 miles per hour at sea level. Cruising speed 120 miles per hour. Stalling speed 57 miles per hour. Climbs at sea level 850 feet per minute. Service ceiling 15,800 feet.

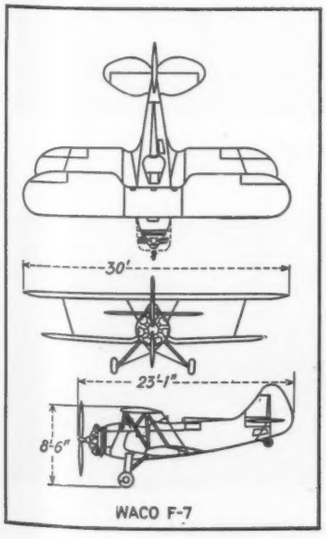

Engine Installation

RYAN Model ST-3

CONSTRUCTION MATERIAL: Wings have solid spruce spars, aluminum alloy ribs, and fabric covering material. Fixed landing gear. Mechanical brakes. Oleo landing gear shock unit. Wheel tail unit. Aluminum alloy monocoque fuselage.

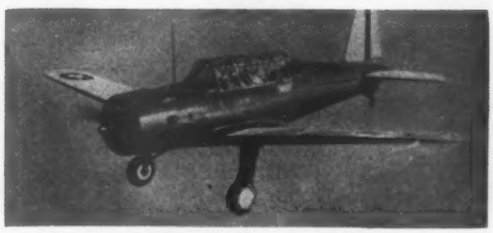
STANDARD EQUIPMENT: Altimeter, oil temperature, oil pressure, tachometer, air speed indicator, compass, and fuel gages.

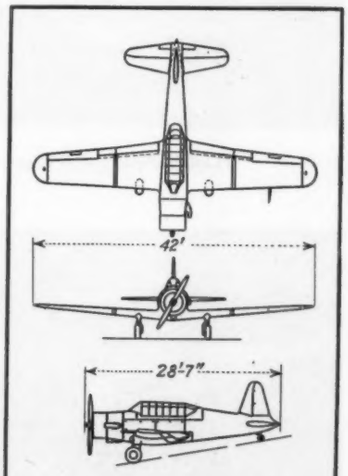
(For further specifications see page 115)



WACO F-7

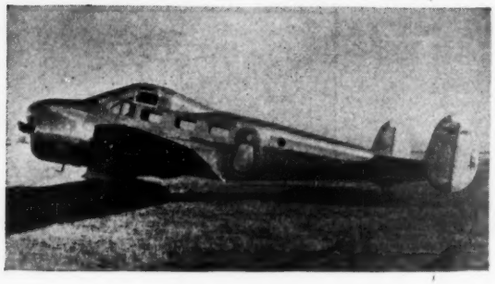
WACO Model LPF-7


VULTEE Model Valiant 54



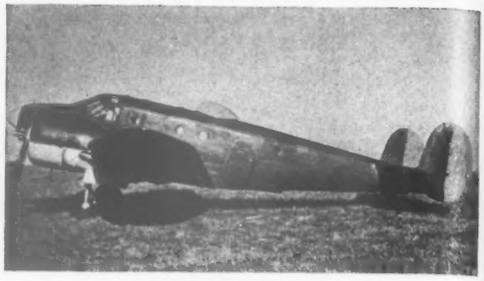
VULTEE VALIANT 54

LATEST MILITARY AIRCRAFT *(Complete Data Not Released)*



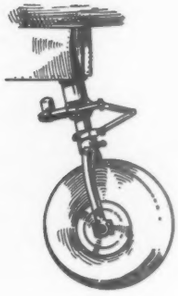
BEECH JRB-1

Tail Wheel
Beech JRB-1

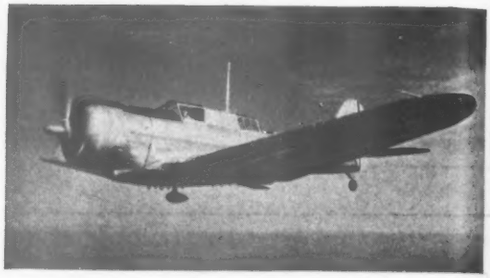


BEECH AT-18R

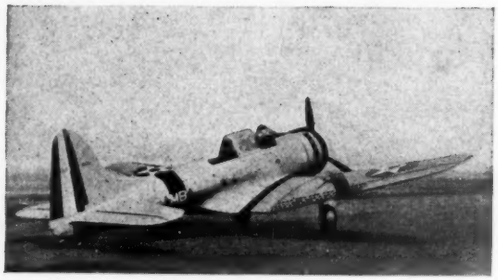
DOUGLAS DB-7



Nose wheel
Douglas DB-7

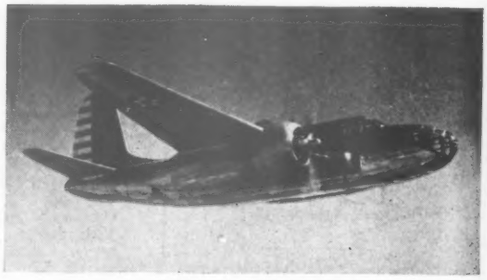


DOUGLAS 8A-5

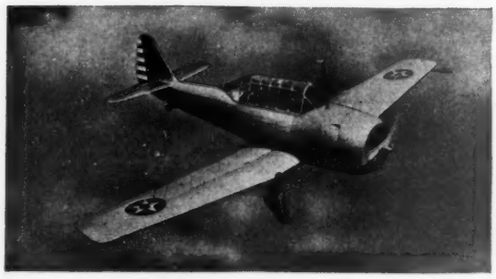


DOUGLAS SBD-1

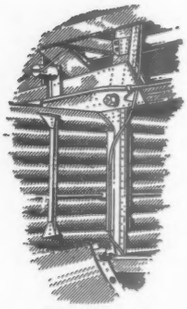
Tail Wheel
Douglas SBD-1



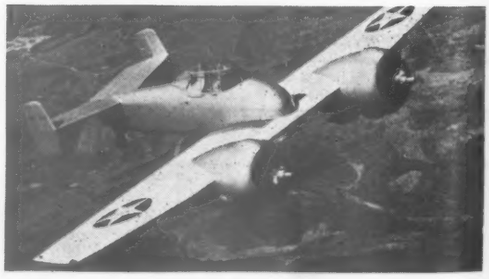
DOUGLAS 8A-20A



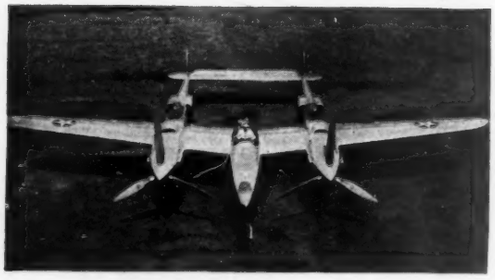
FLEETWINGS XBT-12, Trainer



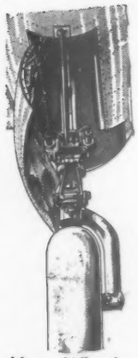
Front Spar Fitting
Fleetwings XBT-12



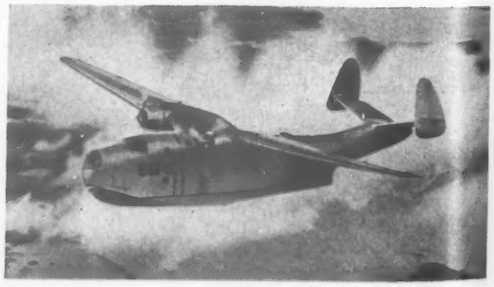
GRUMMAN Skyrocket



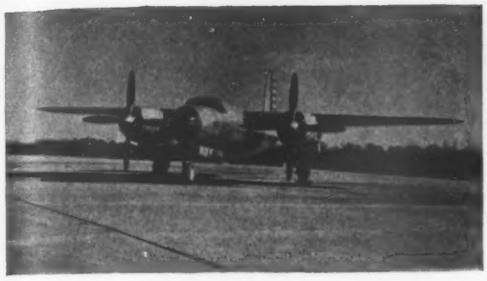
LOCKHEED P-38



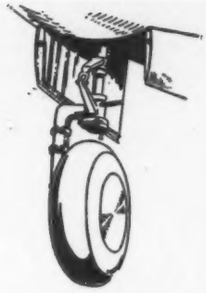
Nose Wheel
Lockheed P-38



MARTIN 162 PBM-1

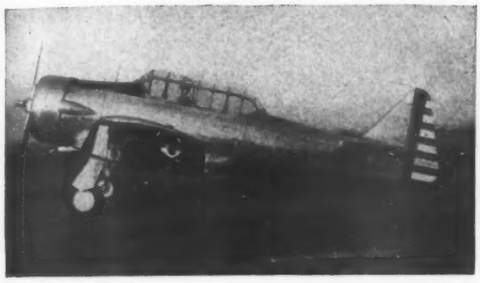


MARTIN B-26

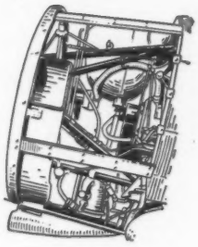


Nose Wheel
Martin B-26

NORTH AMERICAN B-25

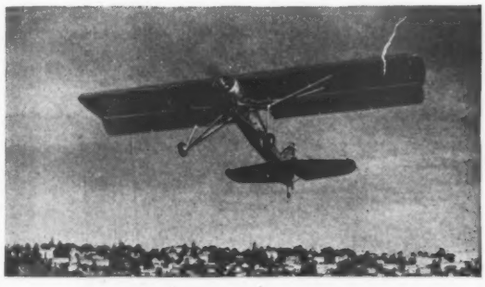


NORTH AMERICAN AT-6A



Engine Mount
N. Amer. AT-6A

STEARMAN A75L3



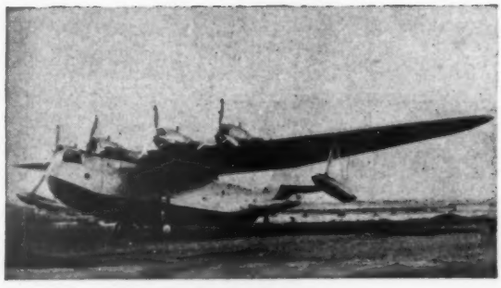
RYAN YO-51 (Dragon Fly)

Fowler Flap
Ryan YO-51

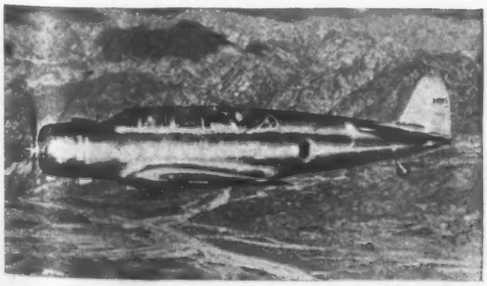
STINSON 0-49

VOUGHT-SIKORSKY XF4U-1

Landing Gear
XF4U-1

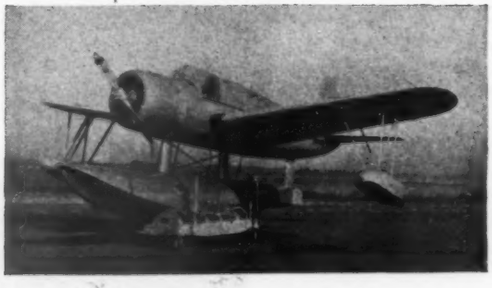


VOUGHT-SIKORSKY XPBS-1



VULTEE V-12C

Retracting Landing
Gear Strut
Vultee V12C



VOUGHT-SIKORSKY XSO2U-1

For National Defense

U. S. NAVY MODEL F4F-3

These Grumman fighter planes are now being produced in quantity as part of our Government's National Defense Program

GRUMMAN AIRCRAFT ENGINEERING CORP.

BETHPAGE LONG ISLAND NEW YORK

New Grumman "midwing" pursuit monoplane now being built in quantity for Great Britain's Fleet Air Arm and the United States Navy. It is powered by a 1,200 H.P. Wright Cyclone Engine, has a top speed of 350 miles per hour and a ceiling of 37,000 feet.

TIMKEN Tapered Roller BEARING EQUIPPED

American military aircraft—like those engaged in the pursuits of peace—are equipped with Timken Bearing Equipped wheels for swift, smooth take-offs and sure-footed landings. Many of them also have TIMKEN Tapered Roller Bearings at other vital points such as engine rocker arms and vibration-dampening engine mounts.

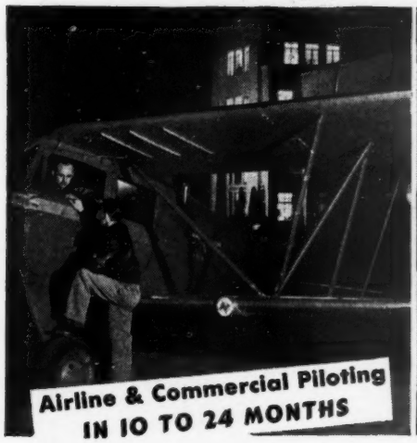
During the last decade of airplane development in the United States, TIMKEN Bearings so greatly have improved ground performance that their use in the landing and tail wheels of airplanes of all types and sizes now is practically 100%.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN
TAPERED ROLLER BEARINGS

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

THIS TRAINING *places*



Never before has the demand for trained pilots been so urgent as it is today. Airline expansion is actually being retarded because of the acute shortage of competently trained pilots. Flight instructors are in demand everywhere. Because of California Flyers' modern fleet and proven training it is absolutely impossible for us to supply the requests for graduate pilots.

In aviation the Master Mechanic is the man responsible for the production, operation and maintenance of the world's great air fleets. At California Flyers the Master Mechanic student receives the practical training that prepares him for a position with airlines and aircraft plants. And it is this training that assures him immediate employment and rapid advancement.

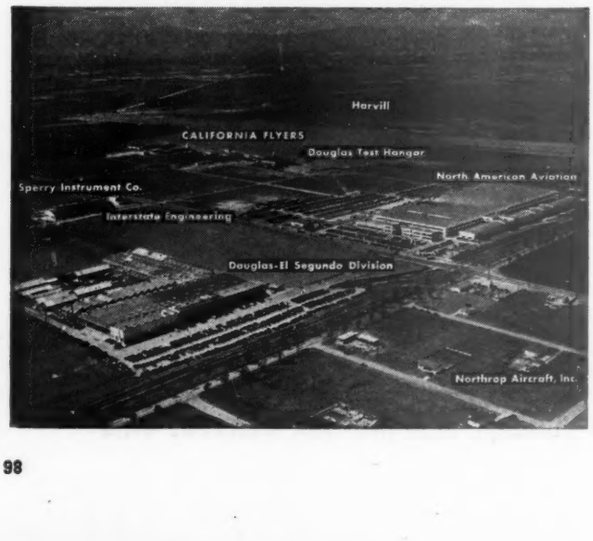
Because the Aeronautical Engineering student at California Flyers trains in the center of modern aviation in America, in the city where half of the Nation's planes are engineered he learns the latest not only in design and engineering but in modern plant procedure. Because of this advanced training the California Flyers graduate's services are in demand everywhere.

and WE CAN'T SUPPLY THE

Yes, you're that close to a position in aviation! Four months to 24 months from the day you enroll at California Flyers, depending on the course, you will be ready for a position in aviation, a position unparalleled in opportunity. And what is more important, a position is waiting for you for ***it is impossible for California Flyers to supply the demand for its graduates.***

Why does California Flyers put you in aviation faster? Here is the answer. From the day you enroll at California Flyers you are *in* aviation, preparing to do your share in the Defense Program. No time is wasted in unrelated, academic subjects. What you get is thorough, practical, industry training geared to the needs of the aviation industry and geared to the needs of our National Defense. What is more important, this training is specified training . . . specified by the industry to fulfill its needs.

California Flyers is not only located in the Nation's Aviation Capital but on the very airport that is the home of these famous aircraft plants.



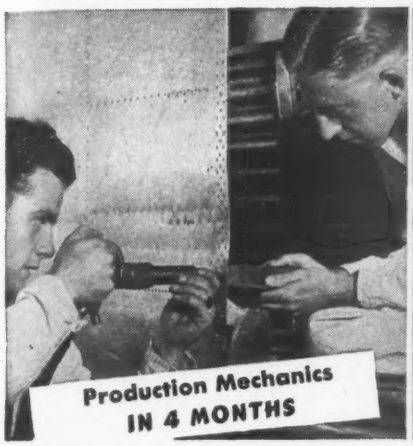
California Flyers is one of the few schools in the country that recognizes the vital need for specialized training, the need not only for Aeronautical Engineers, but for Aircraft Draftsmen—not only for Master Mechanics, but for Production Mechanics and Instrument Technicians—not only for Airline Pilots, but for Commercial Pilots and Flight Instructors. So it is that California Flyers gives you the opportunity of choosing a particular course that best suits your natural talents, and gives you the training which in a shorter space of time fits you for a career in the particular branch of your chosen field.

Why is there such an unprecedented demand for our graduates? An important reason is California Flyers' location in the very heart of aviation in America, on the same airport with the plants of North American, Douglas-El Segundo and Interstate, on the very test field where the famous planes of Douglas, Lockheed, Northrop and Vultee have been tested and proved, in the city which is a terminus for United Airlines, Transcontinental and Western Air, American Airlines and Western Air Express. It is a school that is an integral part of this aviation picture. It is a school which through day to day personal contact works hand and hand with the industry, meeting the industry's personnel problems with men trained to its specifications. *Is it any wonder that this school cannot supply the demand for its graduates?*

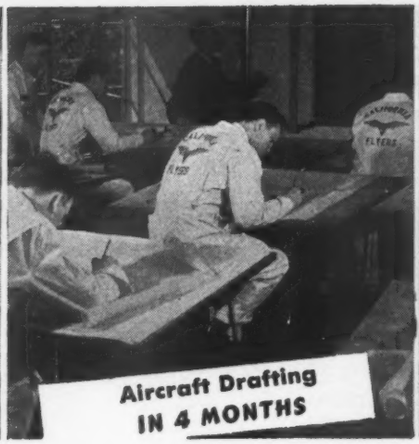
California Flyers is not only approved by the United States Government for Flight and Master Mechanics Courses, selected by the Civil Aeronautics Authority for primary and advanced flight training, but it is one of the few schools chosen by the U. S. Army Air Corps to train its aviation mechanics. It is the school you, too, should choose.

CLIP THE COUPON ON OPPOSITE PAGE

YOU IN AVIATION *in 4 to 24 months*



The Production Mechanic is the Aircraft builder. Because this is the largest field in aviation, the young man entering this branch has unlimited opportunities. At California Flyers the Production Mechanics student is trained to do not only one thing well, but all phases of production from metal forming to final assembly. It is this thorough training that takes him to the top.

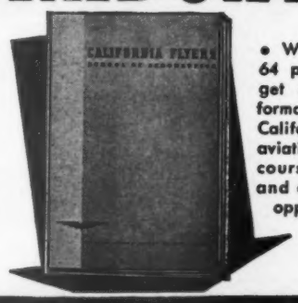


Throughout every stage of planning and production the Aircraft Draftsman is the right hand of the men responsible for the successful design and engineering of the airplane. The young man enrolling at California Flyers secures training that is clear, concise and easy to master. Because of this thorough practical training the graduate's opportunities are unlimited.

With the increased use of instruments the position of Instrument Technician has become of vital importance. At California Flyers the student trains in an active maintenance shop. It is this type of training that prepares him for the many opportunities in the Instrument field—a position in an aircraft plant, an airline, the Civil Service or he may operate his own business.

DEMAND FOR OUR GRADUATES

"I am a California Flyers Graduate." It means something to say that. It means that aviation wants you to the extent that over 96% of all California Flyers graduates are employed in the industry and there are consistently more requests for our graduates than we can supply. It is a passport into aviation. It means also that you are a man marked to succeed like the California Flyers men before you. And that is what *really* counts.



• Write for new 64 page catalog, get complete information on all of California Flyers' aviation training courses, tuition and employment opportunities.

Why does a California Flyers man stand so high? is obvious once you have heard the complete story of this famous school. Its founders believe that aviation should be taught in a school where the student remains an individual—learning aviation as it pertains to his individual ambitions and qualifications, and by so doing he is prepared for the responsibilities of leadership. This trains the graduate to meet today's aviation problems and to contribute to tomorrow's aviation advancement. This is the way today's leaders learned. Only this way can a training program be built for the industry, on industry specifications. They believe too that the entire field of aeronautics—engineering, mechanics and piloting are all closely interwoven and that a student should train in a school that teaches all of these important divisions. Above all, they believe that aviation should be taught in an environment of aviation activity, taught where there is the greatest number of men actively engaged in aviation. This is why California Flyers is located in the heart of the world's aviation capital on the world's busiest testing field.

If this is the kind of school you would like... friendly, efficient, modern and thorough, an aeronautical school operated by practical aviation men, you will be most interested in reading the *complete* story of California Flyers in the new 64 page catalog.

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Please send me your Catalog and Vocational Guide with complete information on training, tuition, living conditions and employment opportunities. I am over 16 and interested in the subjects, checked:

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Instrument and Radio Beam Flying ☐ *Master Mechanics* ☐
Instrument Technician ☐

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A *VETERAN AT TWO*... Back in the early twenties, when aviation was still in its adolescence, the supervisory personnel of the present Northrop Company was actively engaged in the aircraft industry. These men, who are responsible for today's Northrop planes, enjoy an average of over 16 years of aviation experience. Though its corporate existence reaches back barely two years, today Northrop Aircraft, Inc. is a veteran at two.

Now, when production is so all-important, this background of aviation experience accounts for the records being established at the Northrop plant. It is reflected, too, in the superior performance of Northrop built planes. This is another reason to WATCH NORTHROP.

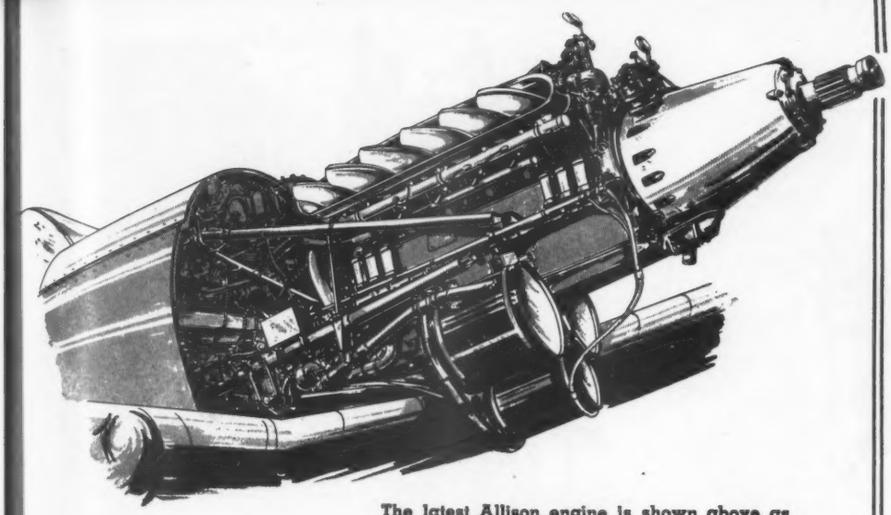
Starting from scratch in March, 1939, the greatly expanded Northrop plant will soon house more than five thousand employees. Here, at record production speed, are manufactured planes and plane parts for the fighting forces of five democratic peoples.

NORTHROP AIRCRAFT, INC. IS AN INDEPENDENT ORGANIZATION NOT AFFILIATED WITH ANY OTHER AIRCRAFT COMPANY.

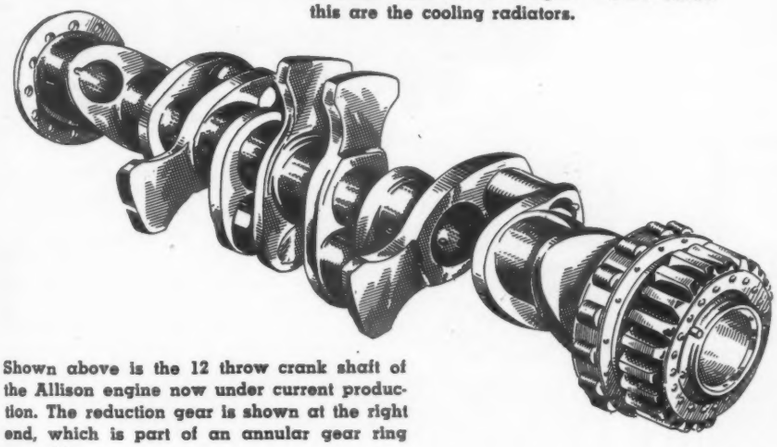
NORTHROP AIRCRAFT, INC. • NORTHROP FIELD, HAWTHORNE, CALIFORNIA, U.S.A. • CABLE "NORAIR"

AMERICAN AIRCRAFT ENGINES FOR 1941

With sketches and photographs of engines and installations, AVIATION presents a cross section of American aircraft engines.

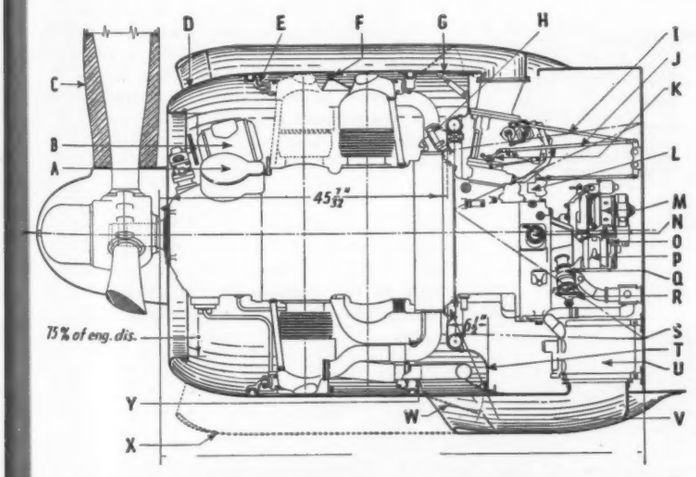


The latest Allison engine is shown above as it is installed in a Curtiss P-40. Notice the method of supporting the engine from the forward ends of the engine mount. Below this are the cooling radiators.

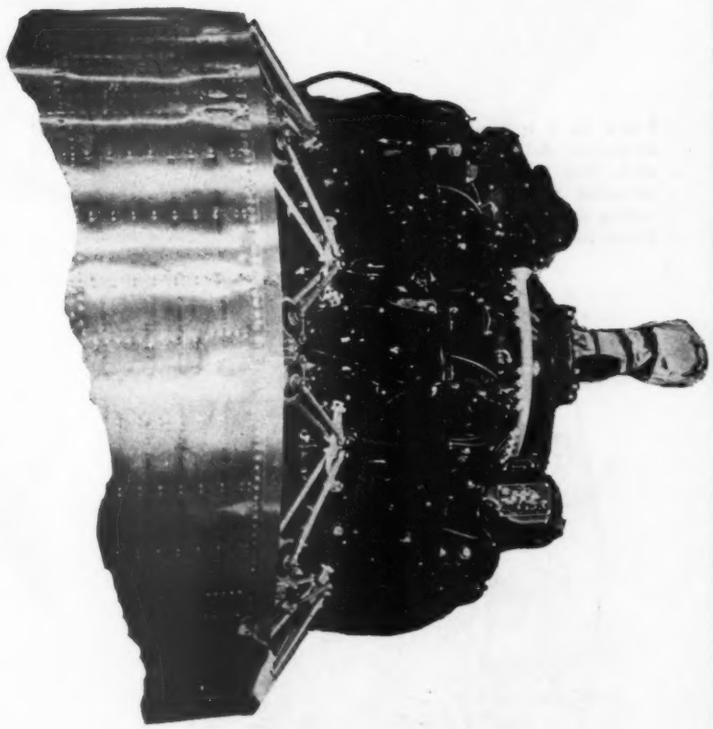


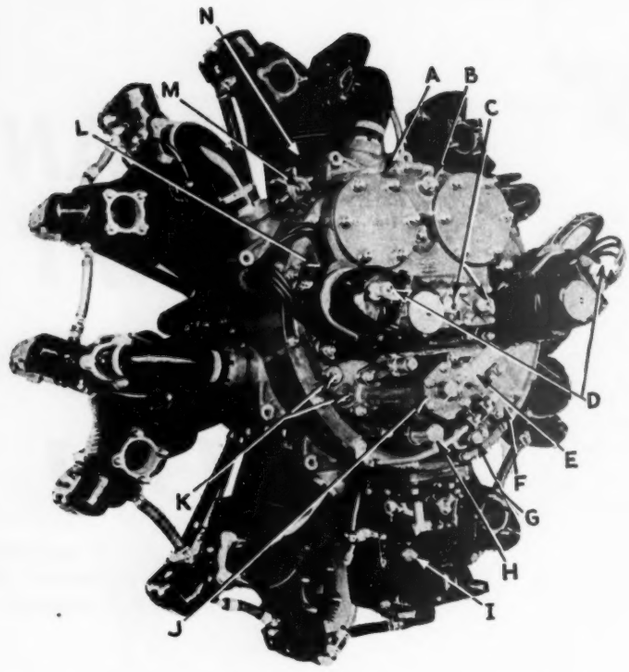
Shown above is the 12 throw crank shaft of the Allison engine now under current production. The reduction gear is shown at the right end, which is part of an annular gear ring assembly.

The Wright Duplex Cyclone engine is shown below as it is installed in the Douglas B-19 Super Bomber. Note the vibration dampening engine mount consisting of nine pairs of mountings spaced at regular intervals around engine mount ring.

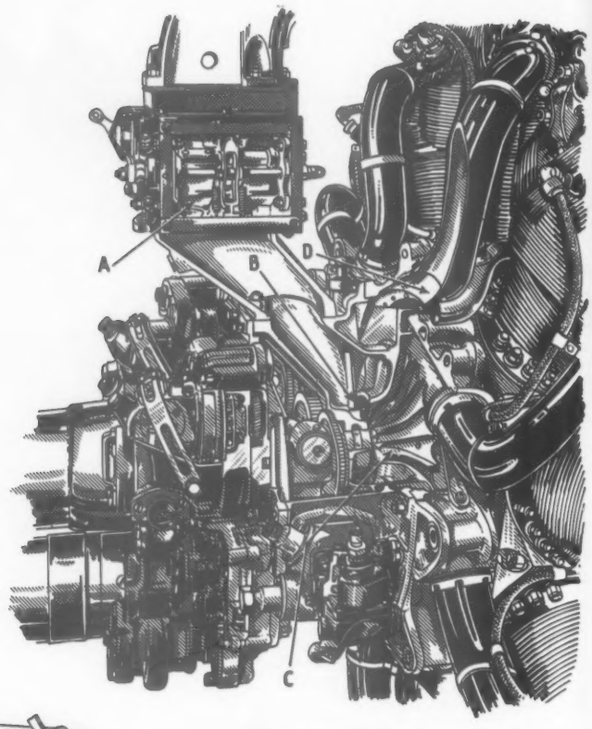


Shown above is a typical power plant installation of the latest Pratt and Whitney R-2800 single stage twin row engine. Around this is placed one of the most recently designed cowls which has caused considerable comment because of its effective cooling. The letters on the drawing refer to A—distributor; B—magneto; C—propeller cuffs; D—N.A.C.A. high speed nose contour; E—flexible cowl support ring mount; F—seal between engine baffles and cowling; G—carburetor pre-heat valve; H—rotated true view of pedestal; I—throttle control; J—mixture control; K—injection carburetor; L—supercharger speed control; M—starter; N—gun synchronizer; O—generator; P—vacuum pump; Q—hydraulic pump; R—fuel pump; S—engine mount ring; T—stamped stainless steel diaphragm; U—dual oil coolers; V—flexible seal between inner and outer diaphragm; W—location of side cowl flaps; X—alternate scoop; Y—exhaust stack slip joint front cylinders only.

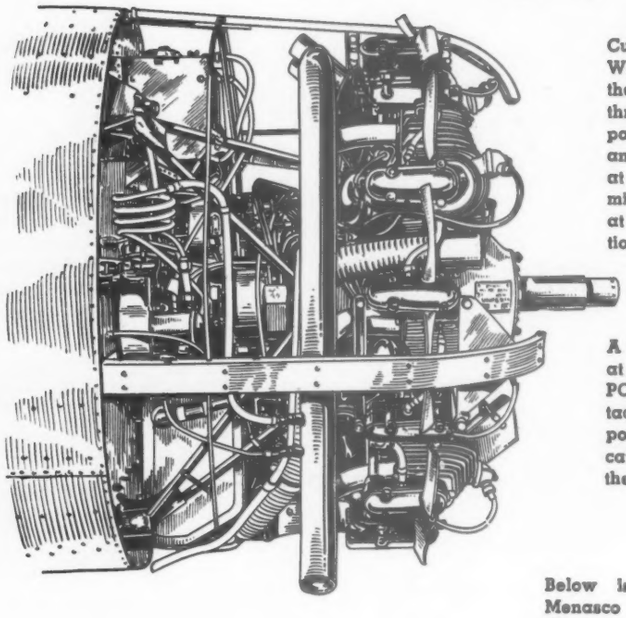




The Jacobs Model L-4PT radial engine above develops 225 hp. The letters on the engine denote: A—starter pad; B—oil tank vent connection; C—tacometer connections; D—ground connections; E—oil outlet connection; F—fuel pump pad; G—oil inlet connection; H—relief valve; I—fuel inlet connection; J—cuno strainer; K—oil pressure connections; L—booster connections; M—primer inlet connection; N—breather connection (hidden).

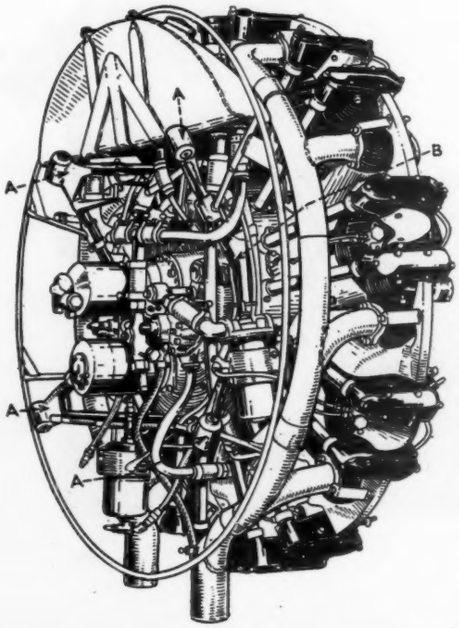


Cutting away the rear section in a Wright G-100 series engine we find the carburetor located at "A" through which the air and gasoline pass down through the intake "B" and into the supercharger impeller at "C", from here the supercharged mixture enters the cylinder intakes at "D" and then into the combustion chamber.

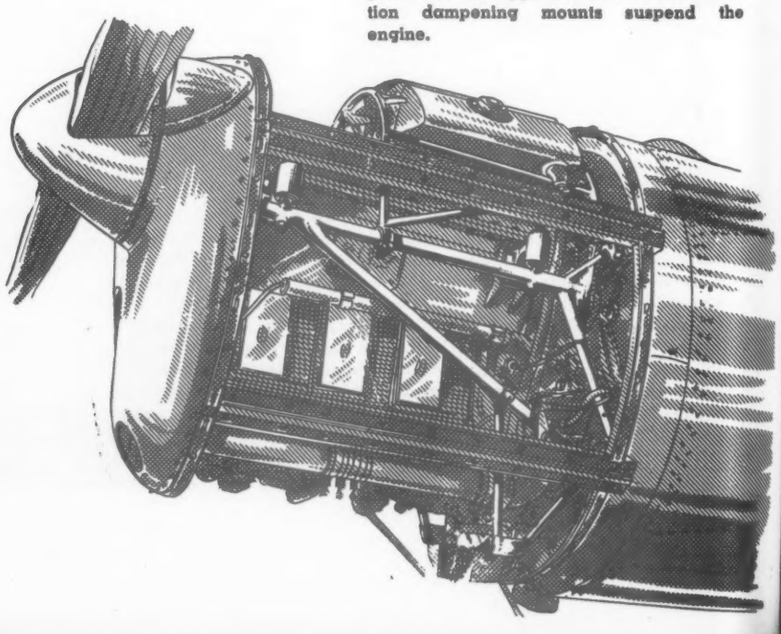


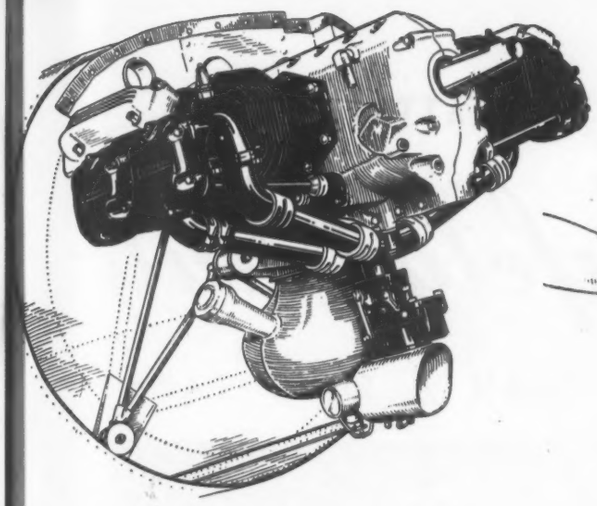
A Warner 165 hp. engine is shown at the left installed in a Harlow PC-5A. The engine mount is attached to the fuselage at four points and the engine ring is located, in the drawing, underneath the exhaust ring.

Below is a typical installation of a Guiberson A-1020 Aircraft Diesel engine. Note the four engine mount attachment fittings at "A" while the engine itself is attached to the engine mount ring "B".

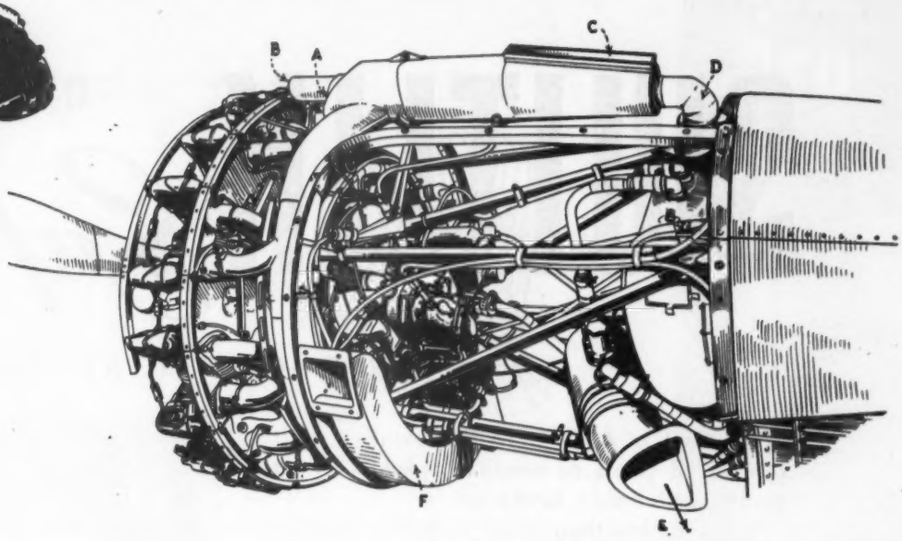


Below is a typical installation of a Menasco engine in a Ryan ST Trainer. Note the two points, with two similar points on the opposite side, where vibration dampening mounts suspend the engine.

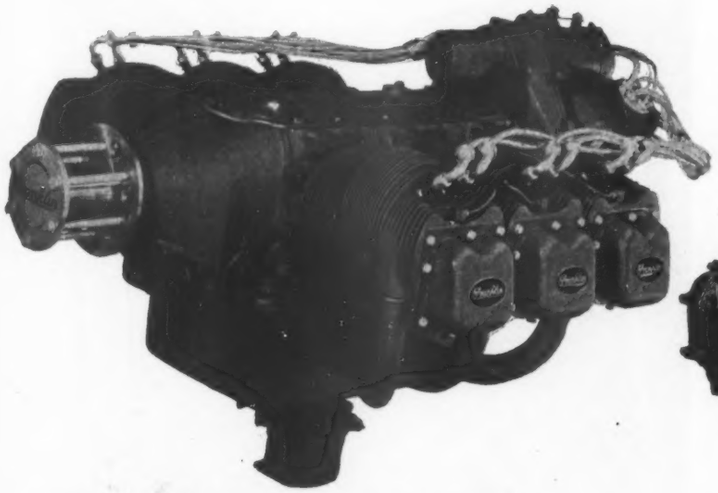




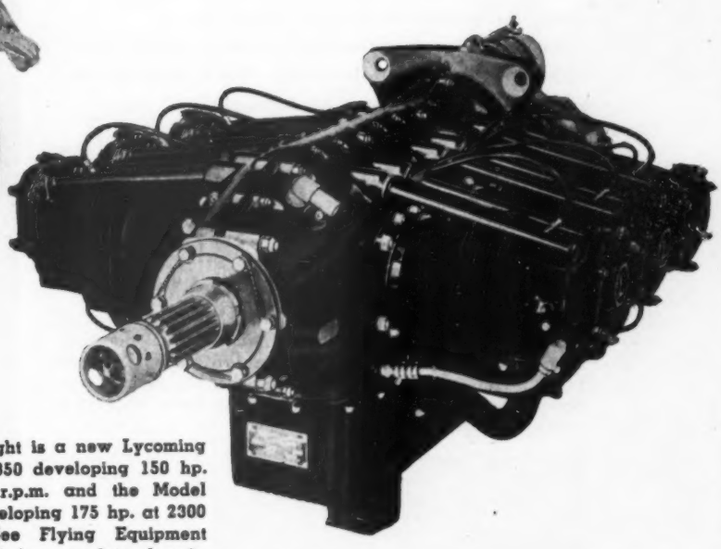
A Continental engine (above) is installed in a Luscombe Model 8A. Directly below the engine is located the oil tank.



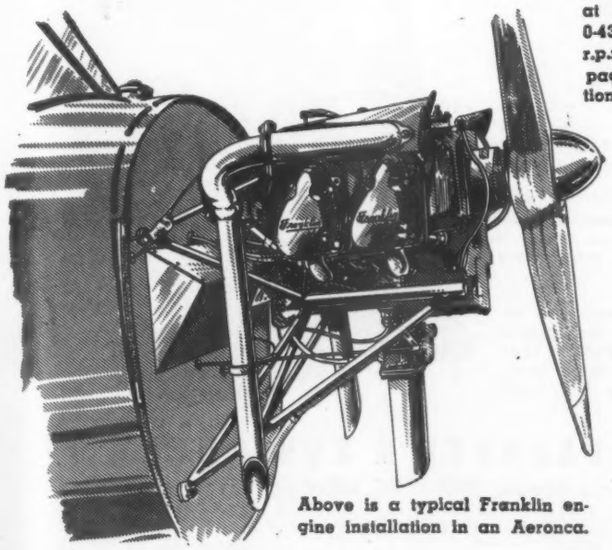
Above is a Pratt & Whitney Wasp Jr. installed in a Grumman G-21 Amphibian. "A" is the exhaust manifold with its exhaust port at "C". "B" is where cabin ventilating air enters the heating pipe which passes through the exhaust manifold and enters the cabin through "D". "F" is the carburetor air intake and "E" is the oil radiator outlet.



Above is the recently announced Franklin six cylinder Model 6AC-298-F3 engine of the latest design. This engine develops 130 hp. at 2550 r.p.m.

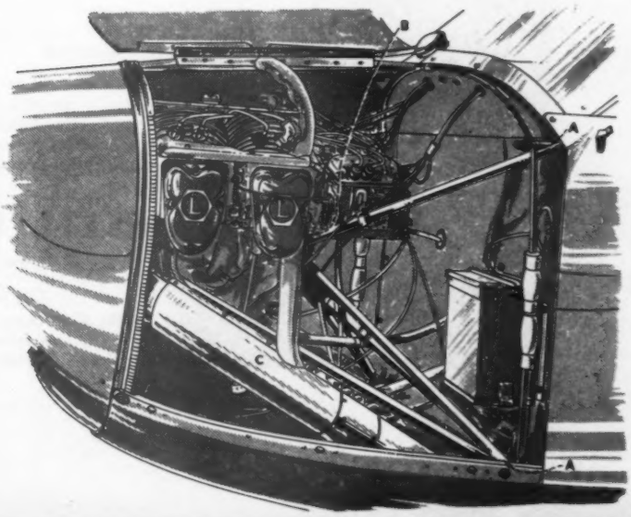


Above right is a new Lycoming Model 0-350 developing 150 hp. at 2500 r.p.m. and the Model 0-435 developing 175 hp. at 2300 r.p.m. (See Flying Equipment page 139 for complete description).



Above is a typical Franklin engine installation in an Aeronca.

Below is a close-up showing a dual ignition 75 hp. Lycoming engine installed in a Funk Model L. The mount is attached at "A" and the engine is supported at "B" and at a similar point at the forward end.



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COSTS NO MORE THAN A FIXED PACK

The QUICK ATTACHABLE feature is a hit! It enabled pilots to combine freedom on the ground with safety in the air.

Weighing less than a suit of clothes, the Switlik *harness* is worn independently from the pack. You enjoy comfort and freedom of movement not possible with any other make of chute. Adopted as standard by U. S. Navy, Coast Guard and many foreign governments.

Keeping the *pack* in the plane seat or back saves it from wear and tear—and it's right there ready to attach when you climb in.

Switlik *Quick Attachable* Parachutes; available in three models—Seat, Back and Chest, to conserve headroom or legroom.

SWITLIK 1941 HANDBOOK *Mailed Free*

Now ready—Switlik 1941 Parachute Handbook; fully illustrated instructions on care and handling; also specifications and descriptions of all Switlik models. Mailed free on request.

VALUABLE FRANCHISES AVAILABLE

World-wide reputation of Switlik Safety Chutes is rapidly increasing the already wide-spread demand. New opportunities constantly arise for responsible and properly equipped firms to act as Switlik *factory representatives* to handle our business in their respective areas. Correspondence invited.

Legroom! . . Headroom! . . and a seat that doesn't rock! You'll be pleasantly surprised by these added advantages of the thin, comfortable, flat-bottomed seat pack and light weight harness of the Switlik *Quick Attachable* Safety Chute.

Place the pack in your seat and go about your chores unhampered. When you're ready—climb in, snap only two connectors—and your chute is *attached.*

Cubs and most light planes are especially provided for by the Switlik *Quick Attachable* Back Pack. Thin pack sinks snugly into chair back, retaining normal legroom and headroom.

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1–3 Seats

Manufacturer	Designation or Model No.	A.T.C. number	Price at factory, $	Type	Number of seats	Make of engine	Total rated h.p.	At altitude, ft.	Fuel capacity (gal.)	Normal range (mi.)	Fuel consumption at cruising speed (gal. per hr.)	Propeller diameter—(in.)	High speed (m.p.h.)	At altitude, ft.	Cruising speed (m.p.h.)	At altitude, ft.	Stalling speed (m.p.h.)	Climb at sea level (ft. per m.)	Service ceiling (ft.)	Wing loading (lb. per sq. ft.)	Power loading (lb. per h.p.)	Weight empty	Gross weight (lb.)	Span
Aeronautical Corp. of America	65-C	675	1,795	CML	2	Con.	65	S.L.	12	250	4.3	76	105	S.L.	98	S.L.	35	650	15,000	6.8	17.7	675	1,150	36′
Aeronautical Corp. of America	65-LA	675	1,795	CML	2	Con.	65	S.L.	17	350	4.3	76	109	S.L.	100	S.L.	38	600	15,000	7.4	19.23	720	1,250	36′
Aeronautical Corp. of America	65-LB	702	1,695	CML	2	Lyc.	65	S.L.	17	350	4.0	70	109	S.L.	100	S.L.	38	600	15,000	7.4	19.23	720	1,250	36′
Aeronautical Corp. of America	65-TL	728	1,425	CML	2	Lyc.	65	S.L.	12	250	4.0	70	100	S.L.	90	S.L.	35	600	15,000	6.8	17.7	700	1,150	35′
Air Transport Mfg. Co., Ltd.	P-2	482	.....	OML	2	K	100	S.L.	30	450	7.0	82	130	1,000	105	1,000	40	1,200	14,000	10.12	16.5	1,020	1,650	32′
Air Transport Mfg. Co., Ltd.	P-2-S	488	.....	OML	2	K	100	S.L.	30	450	7.0	82	135	1,000	110	1,000	42	1,200	14,000	10.73	17.5	1,075	1,750	32′
Akron Aircraft, Inc.	Funk B	715	1,950	CML	2	Funk	63	S.L.	16	400	4.0	76	112	S.L.	100	S.L.	37	750	16,000	8.0	21.75	870	1,350	35′
Akron Aircraft, Inc.	Funk L	715	2,160	CML	2	Lyc.	75	S.L.	16	350	4.5	76	112	S.L.	103	S.L.	37	800	17,000	8.0	18.0	800	1,350	35′
Applegate Amphibians	*P. No. 1*		*2,500*	*A*	2	*Fr 199*	*95*	*S.L.*	*33*	*500*	*6.0*	*72*	*102*	*S.L.*	*85*	*S.L.*	*45*	*450*	*11,000*	*8.63*	*10.8*	*998*	*1,500*	*38′6″*
Bellanca	14-9 Cruisair	716	.....	CML	3	KenRoyce (LeB)	90	.....	20	420	5.0	74	133	.....	120	3,000	45	750	14,000	10.8	19.4	1,050	1,750	34′2″
Culver Aircraft Corp.	Culver Cadet Model LCA	730	2,395	CLM	2	Con	75	S.L.	20	600	4.35	70	140	S.L.	120 Guar.	S.L.	45	800	17,500	10.83	17.40	750	1,305	27′
Engineering & Research Corp.	Ercoupe 415C	718	2,590	CLM	2	Con	65	S.L.	14	350	4.0	72	117	S.L.	105	3,000	40	[2] 800	14,000	8.2	18.1	716	1,175	30′
Fairchild Aircraft	M-62	724	.....	OML	2	Ran	175	S.L.	45	550	10.0	86	140	S.L.	120	S.L.	50	835	16,000	12.25	14.0	1,749	2,450	36′
Gwinn Aircar Co., Inc.	Aircar-1	682	.....	CBL	2–3	Pob II	90	S.L.	25	525	5.0	84	120	S.L.	105	S.L.	[21] 41	.....	.....	10.0	18.9	1,090	1,700	24′
Gwinn Aircar Co., Inc.	*Aircar-2*		.....	*CBL*	*2–3*	*Pob V*	*130*	*S.L.*	*25*	*500*	*6.0*	*84*	*137*	*S.L.*	*120*	*S.L.*	[21] *41*	.....	.....	*10.0*	*13.1*	*1,090*	*1,700*	*24′*
Harlow Aircraft	PJC-2	659	.....	CLM	2	Warner	145	S.L.	34	500	9.5	84	145	S.L.	140	S.L.	52	680	12,700	14.05	17.94	1,800	2,456	35′9⅜″
Harlow Aircraft	*PC-5A*		*On req.*	*OML*	*2*	*Warner*	*165*	*S.L.*	*34*	*480*	*10*	*84*	*154*	*S.L.*	*140*	*S.L.*	*52*	*740*	*14,500*	*14.05*	*15.75*	*1,950*	*2,600*	*35′9⅜″*
Howard Aircraft Corp.	*DGA-125*		.....	*OML*	*2*	*Warner*	*125*	.....	*31*	*365*	*8.3*	*87½*	*118*	*S.L.*	*108*	*S.L.*	*50*	*800*	*13,500*	*11.14*	*16.0*	*1,350*	*2,000*	*34′*
Interstate Aircraft & Engineering Corp.	S-1 Cadet	2,558	.....	CLM	2	Con	50	O	12	350	.....	76	103	O	93	O	36	500	12,500	6.7	23.0	.....	1,150	35′6″
Interstate Aircraft & Engineering Corp.	*S-1A Cadet*		.....	*CLM*	*2*	*Con*	*65*	*O*	*15*	*375*	.....	*76*	*107*	*O*	*97*	*O*	*36*	*700*	*14,500*	*6.9*	*18.5*	*700*	*1,200*	*35′6″*
Interstate Aircraft & Engineering Corp.	*S-1A-65F Cadet*		.....	*CLM*	*2*	*Fr*	*65*	*O*	*15*	*375*	.....	*76*	*107*	*O*	*97*	*O*	*36*	*700*	*14,500*	*6.9*	*18.5*	*700*	*1,200*	*35′6″*
Johansen Aircraft Corp.	*JA-3*		*1,795*	*CML*	*2*	*Lyc*	*65*	*S.L.*	*15*	*350*	*4.0*	*72*	*108*	*S.L.*	*96*	*S.L.*	*39*	*680*	*15,000*	*6.6*	*18.8*	*700*	*1,225*	*36′*
Kellett Autogiro Corp.	KD-1B	712	.....	CLGY	1	Ja	225	S.L.	30	208	14.0	102	127	S.L.	102	S.L.	No	1,060	14,000	40.8	10.0	1,630	2,250	40′
Kellett-Autogiro Corp.	KD-1	712	.....	OLGY	2	Ja	225	S.L.	30	205	14.0	102	125	S.L.	100	S.L.	No	1,060	14,000	40.6	9.98	1,600	2,245	40′
Luscombe Airp. Corp.	8-A	694	2,195	CML	2	Con	65	S.L.	15	350	4.25	76	115	S.L.	104	S.L.	37	900	15,000	8.6	18.5	650	1,200	35′
Luscombe Airp. Corp.	8-A Seaplane	694	3,150	CMS	2	Con	65	S.L.	15	350	4.25	76	102	S.L.	95	S.L.	40	650	10,000	9.0	19.4	791	1,260	35′
Luscombe Airp. Corp.	8-B1	624	1,785	CML	2	Ly	65	S.L.	15	375	4.00	76	112	S.L.	102	S.L.	37	900	15,000	8.6	18.5	650	1,200	35′
Luscombe Airp. Corp.	8-C Silvaire	694	2,795	CML	2	Con	75	S.L.	15	350	4.75	72	120	S.L.	110	S.L.	37	1,100	17,000	8.6	16.0	720	1,200	35′
Monocoupe Corp.	Deluxe 90-W	2–306	4,950	CML	2	War	125	S.L.	28	580	6.3	78	150	S.L.	130	6,000	40	1,300	19,000	12.2	17.9	1,020	1,610	32′
Monocoupe Corp.	Deluxe 90-A	306	3,595	CML	2	Lam	90	S.L.	28	600	4.8	78	130	S.L.	110	S.L.	40	900	15,000	12.2	17.9	973	1,610	32′
Monocoupe Corp.	110-Special	327	5,600	CML	2	War	145	S.L.	28	530	8.5	78	186	S.L.	162	S.L.	55	2,100	23,800	17.4	11.3	1,045	1,630	23′2½″
Naugle Aircraft Co.	*Mercury N-1*	.....	*Under 1,700*	*CLM*	*2*	*Ly*	*75*	*S.L.*	*15*	*450*	*4.6*	*72*	*145*	*S.L.*	*130*	*S.L.*	[22] *45*	*1,200*	*20,000*	*8.5*	*15.3*	*610*	*1,150*	*30′*
Naugle Aircraft Co.	*Mercury N-2*	.....	*Under 2,000*	*CLM*	*2*	*3Ly*	*75*	*S.L.*	*20*	*600*	*4.6*	*66*	*160*	*S.L.*	*140*	*S.L.*	[23] *45*	*1,200*	*20,000*	*9.0*	*16.2*	*650*	*1,220*	*30′*
Phillips Aviation Co.	1-B	693	5,800	CML	2	Men	125	S.L.	43	720	8.5	84	140	S.L.	130	8,000	49	710	13,500	13.0	17.6	1,475	2,170	32′6″
Piper Aircraft Corp.[46, 47, 48]	J-3 Cub Trainer	*660	995	CML	2	A-40-4,5 (Con A-40)	40	S.L.	9	200	3.0	69	85	S.L.	70	S.L.	38	400	10,000	5.6	25.0	574	1,000	35′2½″
Piper Aircraft Corp.[47, 48]	J-3C-65 Cub Trainer	*691	1,498	CML	2	A-65-B (Con A-65)	65	S.L.	12	240	4.0	72	90	S.L.	85	S.L.	39	675	12,000	6.18	17.0	600	1,100	35′2¼″
Piper Aircraft Corp.[47, 48]	J-3C-50 Cub Trainer	*691	1,368	CML	2	(50-1 or 3) (Con A-50)	50	S.L.	12	250	3.6	76	91	S.L.	80	S.L.	40	650	12,000	6.18	22.0	600	1,100	35′2¼″
Piper Aircraft Corp.[47, 48]	J3F-65 Cub Trainer	*692	1,298	CML	2	Fr.AC-1-50176	50	S.L.	12	260	3.5	70	89	S.L.	79	S.L.	40	600	12,000	6.18	22.0	590	1,100	35′2¼″
Piper Aircraft Corp.[47, 48]	J3L Cub Trainer	*698	1,298	CML	2	Ly O-145	50	S.L.	12	260	3.5	70	90	S.L.	.....	S.L.	40	.....	12,000	6.18	22.0	590	1,100	35′2¼″
Piper Aircraft Corp.[47, 48]	J4 Coupe	*703	.....	CML	2	Con A-75	75	S.L.	25	520	4.6	70	100	S.L.	93	S.L.	41	700	12,000	7.1	19.0	800	1,400	36′2″
Piper Aircraft Corp. 4, 2	J4 Coupe	721	1,898	CML	2	Ly O-145	65	S.L.	16	382	4.0	70	100	S.L.	87	S.L.	41	600	12,000	7.1	20.0	800	1,301	36′2″
Piper Aircraft Corp. 4, 2	J5 Cruiser	725	1,798	CML	3	A-75 Con	75	S.L.	18	320	4.6	72	100	S.L.	87	S.L.	42	450	10,000	8.1	19.4	750	1,450	35′5½″
Piper Aircraft Corp.	J5 Cruiser	725	1,798	CML	3	Ly-GO-145	75	S.L.	18	320	4.6	78	100	S.L.	93	S.L.	42	475	10,000	8.1	19.4	750	1,450	35′5½″
Piper Aircraft Corp.	J3L-65 Trainer	698	1,298	CML	2	Ly-O-145 B1	65	S.L.	12	250	4.0	70	90	S.L.	85	S.L.	40	675	12,000	6.18	17.0	590	1,100	35′2½″
Pitcairn Autogiro Co.	*PA-36*		.....	*LCGY*	*2*	*War*	*175*	*S.L.*	*36*	*375*	[30] *10*	*92*	*121*	*S.L.*	[21] *102*	*S.L.*	*0.0*	*805*	*15,000*	[142.0]	*11.7*	*1,425*	*2,050*	*43′0″*
Porterfield Aircraft Corporation	CP-55[39]	690	1,465	CML	2	Con	50	S.L.	11	320	4.0	76	104	S.L.	93	S.L.	33	490	13,000	6.9	21.1	675	1,108	34′9″
Porterfield Aircraft Corporation	CP-65[39]	720	1,665	CML	2	Con	65	S.L.	13.5	290	4.75	75	111	S.L.	100	S.L.	33	670	16,000	6.9	17.9	675	1,160	34′9″
Porterfield Aircraft Corporation	LP-65[39]	720	1,495	CML	2	Lyc:m	65	S.L.	13.5	290	4.5	69	109	S.L.	98	S.L.	33	560	15,000	6.9	17.9	675	1,160	34′9″
Porterfield Aircraft Corporation	*FP-65*[39]	.....	*1,560*	*CML*	*2*	*Franklin*	*65*	*S.L.*	*13.5*	*290*	*4.5*	*69*	*109*	*S.L.*	*96*	*S.L.*	*33*	*600*	*16,000*	*6.9*	*18.5*	*675*	*1,200*	*34′9″*
Porterfield Aircraft Corporation	*75-C*	.....	*2,295*	*CML*	*2*	*Con*	*75*	*S.L.*	*18*	*350*	*5.5*	*70*	*118*	*S.L.*	*105*	*S.L.*	.....	*800*	*12,000*	*9.0*	*17.7*	*820*	*1,326*	*32′*
Porterfield Aircraft Corporation	90	611	.....	CML	2	War	90	S.L.	18	330	6.5	80	133	S.L.	120	S.L.	40	1,050	20,000	9.0	14.7	826	1,326	32′
Rearwin Aircraft & Engines, Inc.	Sportster-7000	*574	2,795	CML	2	K-R	70	S.L.	24	500	4.8	76	115	800	103	800	38	670	13,000	8.8	20.8	853	1,460	35′
Rearwin Aircraft & Engines, Inc.	Sportster-9000KR	*591	3,295	CML	2	K-R	90	S.L.	24	500	5.0	76	125	800	112	800	38	1,000	15,000	8.8	16.2	830	1,460	35′
Rearwin Aircraft & Engines, Inc.	Sportster-9000	*624	On req.	CML	2	War	90	S.L.	24	450	5.7	76	123	800	110	800	38	1,000	15,000	8.8	16.2	861	1,460	35′
Rearwin Aircraft & Engines, Inc.	Speedster-£090M	661	4,495	CML	2	Men	125	S.L.	34	575	8.0	76	150	800	130	800	48	1,300	18,000	11.88	13.6	1,070	1,700	32′
Rearwin Aircraft & Engines, Inc.	Cloudster-8090	711	3,795	CML	2	K-R	90	S.L.	34	650	5.0	.....	125	800	110	800	48	750	14,000	10.11	18.15	1,030	1,635	34′1⅜″
Rearwin Aircraft & Engines, Inc.	Cloudster-8125	711	4,295	CML	2	K-R	120	S.L.	34	625	7.0	.....	145	800	125	800	48	1,000	17,000	10.73	14.45	1,070	1,734	34′1⅜″
Rearwin Aircraft & Engines, Inc.	Cloudster-8135	711	4,495	CML	3	K-R	120	S.L.	34	600	7.0	.....	145	800	125	800	50	900	15,000	11.12	15.0	1,120	1,800	34′1⅜″
Rearwin Aircraft & Engines, Inc.	*Skyranger 165*	.....	*2,195*	*CML*	*2*	*Con*	*65*	*S.L.*	*24*	*500*	*3.65*	.....	*105*	*800*	*95*	*800*	*38*	*550*	*12,000*	*8.2*	*20.77*	*760*	*1,350*	*34′*
Rearwin Aircraft & Engines, Inc.	Skyranger 175	729	2,295	CML	2	Con	75	S.L.	24	500	4.45	.....	110	800	100	800	38	625	14,000	8.2	18.0	760	1,350	34′
Rearwin Aircraft & Engines, Inc.	*Skyranger 180-F*	.....	*2,475*	*CML*	*2*	*Franklin*	*80*	*S.L.*	*24*	.....	*4.7*	.....	*115*	*800*	*105*	*800*	*38*	*720*	*15,500*	*8.2*	*16.9*	[40-a] *810*	*1,350*	*34′*
Rearwin Aircraft & Engines, Inc.	*Skyranger 190-F*	.....	*2,575*	*CML*	*2*	*Franklin*	*90*	*S.L.*	*24*	.....	*5.2*	.....	*121*	*800*	*112*	*800*	*38*	*910*	*16,800*	*8.2*	*15.0*	[40-a] *815*	*1,350*	*34′*
Ross Aircraft Corp.	RS-1	732	875	OML	2	Con	40	.....	9	240	2.8	69	83	.....	75	.....	40	360	9,000	6.4	23.5	518	940	30′
Ross Aircraft Corp.	*RS-2*		*940*	*OML*	*2*	*Ly*	*50*	.....	*9*	*240*	*3.0*	*71*	*90*	.....	*80*	.....		*400*	*10,000*	*6.4*	*18.8*	*518*	*940*	*30′*
Ryan Aeronautical Co.	S-C	658	.....	CML	3	War	145	S.L.	37	525	9.5	82	150	S.L.	135	8,500	45	900	17,200	10.7	14.8	1,345	2,150	37′6″
Ryan Aeronautical Co.	ST-A	571	.....	OML	2	Men	125	S.L.	24	366	8.0	80	126	S.L.	115	3,000	54	800	16,000	12.9	12.8	1,031	1,600	29′11″
Ryan Aeronautical Co.	ST-A Special	681	.....	OML	2	Men	150	3,000	24	326	10.0	80	142	3,000	128	3,000	54	975	18,600	12.9	10.7	1,083	1,600	29′11″
Skylark Aircraft Corp.	Skylark W-1-42[2]	2–546	.....	OCML	2	War	125	S.L.	31	545	6.0	96	130	S.L.	117	S.L.	35	800	19,000	10.0	15.2	1,300	1,900	35′10″
Southern Aircraft Corp.	*BM-10A*	.....	.....	*O-B*	*2*	*Ly*	*225*	.....	*42*	*355*	.....	*102*	*125*	.....	.....	.....	*50*	*850*	*15,000*	*9.16*	*12.4*	*2,070*	*2,790*	*34′1″*
Southern Aircraft Corp.	*BM-10B*	.....	.....	*O-B*	*2*	*Ja*	*225*	.....	*42*	*355*	.....	*102*	*123*	.....	.....	.....	*50*	*850*	*15,000*	*9.16*	*12.4*	*2,070*	*2,790*	*34′1″*
Southern Aircraft Corp.	*BM-10C*	.....	.....	*O-B*	*2*	*Con*	*225*	.....	*42*	*355*	.....	*102*	*123*	.....	.....	.....	*50*	*850*	*15,000*	*9.16*	*12.4*	*2,070*	*2,790*	*34′1″*
Stearman Jensen	*A*	.....	.....	*CLM*	*2*	*Ly*	*65*	*S.L.*	*20*	*450*	*4.7*	*70*	*115*	*S.L.*	*105*	*S.L.*	*45*	*750*	*14,000*	*8.68*	*17.63*	*618*	*1,146*	*30′*
St. Louis Aircraft Corp.	*PT-1*		*14,000*	*2 PolB*	*2*	*Wr*	*225*	*S.L.*	*42*	*350*	*13.9*	*108*	*130*	*S.L.*	*116*	*S.L.*	*53*	*880*	*15,000*	*9.4*	*12.3*	*2,055*	*2,770*	*33′10″*
St. Louis Aircraft Corp.	*PT-LM-4*		*10,000*	*2 PolM*	*2*	*Ran*	*180*	*S.L.*	*32*	*345*	*11.4*	*87*	*137*	*S.L.*	*125*	*S.L.*	*55*	*1,000*	*18,000*	*12.8*	*11.1*	*1,398*	*2,012*	*30′0″*
Stinson Aircraft	*Standard*		*3,353*	*CML*	*3*	*Fr*	*90*	*S.L.*	*20*	.....	.....	*72*	*115*	*S.L.*	*110*	*S.L.*	*43.5*	*600*	*14,000*	*10.5*	*18.0*	*954*	*1,625*	*34′*
Stinson Aircraft	*Super-Deluxe*		*3,696*	*CML*	*3*	*Fr*	*90*	*S.L.*	*20*	.....	.....	*72*	*115*	*S.L.*	*110*	*S.L.*	*43.5*	*600*	*14,000*	*10.5*	*18.0*	*1,018*	*1,625*	*34′*
Summit Aeronautical Corp.	*HM-5*		.....	*CLM*	*2*	*Con*	*75*	*S.L.*	*18*	*480*	*4.7*	*70*	*137*	*S.L.*	*125*	*S.L.*	*42*	*800*	*16,000*	*11.25*	*18.0*	*825*	*1,350*	*27′*
Taylorcraft Aviation Corp.	BL-65	696	.....	CML	2	Ly	65	S.L.	12	250	3.75	.....	105	S.L.	95	S.L.	38	640	15,000	6.8	17.7	660	1,150	36′
Taylorcraft Aviation Corp.	BL-T (Trainer)	*700	.....	CML	2	Ly	50	S.L.	12	270	3.5	.....	97	S.L.	88	S.L.	38	450	13,000	6.8	23.0	632	1,150	36′
Taylorcraft Aviation Corp.	BC12-65	696	.....	CML	2	Con	65	S.L.	18	375	4.0	72	105	S.L.	95	S.L.	38	600	15,000	7.1	18.4	700	1,200	36′
Taylorcraft Aviation Corp.	BL12-65	700	.....	CML	2	Ly	65	S.L.	18	375	4.0	72	105	S.L.	95	S.L.	38	600	15,000	7.1	18.4	700	1,200	36′
Taylorcraft Aviation Corp.	*BF12-65*		.....	*CML*	*2*	*Franklin*	*65*	*S.L.*	*18*	*375*	*4.0*	*72*	*105*	*S.L.*	*95*	*S.L.*	*38*	*600*	*15,000*	*7.1*	*18.4*	*700*	*1,200*	*36′*
Timm Aircraft Corp.	S160 K		.....	OML	2	K	160	S.L.	24	228	9.5	99	138	S.L.	120	S.L.	50	900	17,000	13.45	15.3	1,901	2,450	36′
Timm Aircraft Corp.	PT175-K		.....	OML	2	K	175	S.L.	40	400	10	99	145	S.L.	126	S.L.	50	900	17,500	13.15	13.7	1,700	2,400	36′
Waco Aircraft Co.	UPF-7	642	.....	OBL	2	ConRi	220	S.L.	50	[19] 402	12.5	.....	126	S.L.	100	S.L.	51	849	14,300	10.85	12.06	2,564	2,650	30′
Waco Aircraft Co.	YPF-7	586	.....	OBL	2	JaRi	225	S.L.	50	[19] 440	12.4	.....	130	S.L.	110	S.L.	51	921	15,000	10.85	11.80	2,379	2,650	30′
Wally Timm, Inc.	*LPF-7*		.....	*OBL*	*2*	*LyRi*	*220*	*S.L.*	*50*	[19] *320*	*12.5*	.....	*125*	*S.L.*	*105*	*S.L.*	*51*	*868*	*14,600*	*10.85*	*12.06*	*2,593*	*2,650*	*30′*
Welch Airc. Industries, Inc.	Aero-Craft	733	.....	OML	2	Kinner	160	S.L.	.....	400	.....	.....	125	S.L.	115	S.L.	45	1,100	17,950	10.9	13.5	1,302	1,916	34′5½″
Welch Airc. Industries, Inc.	OW5M	637	996	CML	2	Con	40	S.L.	9	250	3.0	66	93	S.L.	85	S.L.	32	460	12,000	6.6	25.7	528	950	34′4″
Welch Airc. Industries, Inc.	OW6M	636	996	CML	2	Aer	36	S.L.	9	250	3.0	66	93	S.L.	85	S.L.	32	475	12,500	6.7	26.0	498	954	34′4″
Welch Airc. Industries, Inc.	*OW7M*	.....	*996*	*CML*	*2*	*Welch 0-2*	*45*	*S.L.*	*9*	*250*	*3.1*	*70*	*96*	*S.L.*	*88*	*S.L.*	*29*	*550*	*13,500*	*5.99*	*20.0*	*500*	*950*	*34′4″*
Welch Airc. Industries, Inc.	OW5M Trainer	2–474	890	CML	2	Franklin	50	S.L.	10	290	3.5	72	100	S.L.	90	S.L.	32	630	14,000	6.6	19.0	538	950	36′
Welch Airc. Industries, Inc.	*OW8M*	.....	*1,195*	*CML*	*2*	*Con*	*40*	.....	*9*	*250*	*3.0*	*69*	*93*	*S.L.*	*85*	*S.L.*	*32*	*460*	*14,000*	*6.6*	*19.0*	*538*	*950*	*34′4″*
Wendt Aircraft Corp.	OW5M Trainer	2–474	890	CML	2	Con	40	.....	9	250	3.0	69	93	S.L.	85	S.L.	32	460	12,000	6.6	25.7	525	950	34′4″
Wendt Aircraft Corp.	*OW9M*	.....	*1,195*	*CML*	*2*	*Ly*	*55*	*S.L.*	*10*	*250*	*3.2*	*72*	*100*	*S.L.*	*90*	*S.L.*	*32*	*635*	*14,800*	*6.6*	*18.1*	*540*	*1,000*	*34′4″*
White Aircraft Corp.	*W-2*	.....	*3,175*	*2 Pcml*	*2*	*Kr,LeB*	*90*	*S.L.*	*25*	*600*	*5*	*78*	*132*	.....	*125*	*2,500*	.....	*1,000*	*16,000*	*10.0*	*15.5*	*765*	*1,400*	*30′*
	PT-7	.....	.....	*OLB*	*2*	*War KR5-82*	*160*	.....	*36*	*332.5*	.....	.....	*115*	.....	*95*	.....	*40*	*1,000*	.....	*9.27*	*13.6*	.....	*2,242*	*31′*

raft Specifications

nsibility for the figures given

s		Dimensions			(Area —Sq. Ft.)						Wings			Landing Gear							Fuselage or Hull †
Weight supply	Gross weight (lb.)	Span	Length overall	Height overall	Wing (including ailerons)	Ailerons (total)	Fin	Rudder	Stabilizer	Elevators (total)	Spars	Ribs	Covering material	Type	Tread (in.)	Wheel type and size	Brakes (type and make)	Landing gear shock unit (type and make)	Tail unit		
675	1,150	36′	21′1″	9′	169	19.8	6.5	8.2	13.6	11.54	Sol,Sp	Sp	Fab	Fx	72	Sh 6.00x6	Sh,Mech	Ol	SkWh		ST,Wl,Fab
720	1,250	36′	21′1″	9′	169	19.8	6.5	8.2	13.6	11.54	Sol,Sp	Sp	Fab	Fx	72	Sh 6.00x6	Sh,Mech	Ol	SkWh		ST,Wl,Fab
720	1,250	36′	21′1″	9′	169	19.8	6.5	8.2	13.6	11.54	Sol,Sp	Sp	Fab	Fx	72	Sh 6.00x6	Sh,Mech	Ol	SkWh		ST,Wl,Fab
700	1,150	35′	22′4″	6′6″	169	19.7	6.5	8.2	13.6	11.54	Sol,Sp	Alum	Fab	Fx	70	Sh 6.00x6	Sh,Mech	Ol	SkWh		ST,Wl,Fab
020	1,650	32′	24′	7′	163.0	16.2	2.5	7.0	17.0	13.5	Sp,Box	W	Fab	Fx	70	Aut 20x9–4	Aut	Sc	Sk		ST,Wl,Fab
075	1,750	32′	24′	7′	163.0	16.2	2.5	7.0	17.0	13.5	Sp,Box	W	Fab	Fx	70	Aut 20x9–4	Aut	Sc	Wh		ST,Wl,Fab
870	1,350	35′	20′	6′	169.0	23.0	5.28	6.16	15.2	10.0	Lmd,Sp	Sp	Fab	....	72	Firestone	Sh,Mech	Ol,Sp	Oleo		.....
800	1,350	35′	20′	6′	169.0	19.0	4.5	6.94	15.2	10.0	Lmd,Sp	Sp	Fab	....	72	Firestone	Sh,Mech	Ol	Ol		.....
998	*1,500*	38′6″	25′	8′	*183.0*	*19.2*	*4.66*	*6.76*	*14.66*	*10.64*	*Sp*	*Nicrl.*	*Fab*	*Re*	*58*	*Ha,800x4*	*Hyd,Pal*	*Ru*	*Sk*		*D,525*
050	1,750	34′2″	21′3″	6′3″	162.0	14.0	6.5	5.8	16.07	9.36	Spr.Plank	S.Ply	Ply	Re	8′9″	8.00x4	Pal,Hyd	Ol	Wh		ST,Fab
750	1,305	27′	17′8″	5′6″	120.0	9.22	3.77	3.57	12.40	5.26	Lmd,Sp	W	Fab	Re	79	Ha5.00x4	Ha,ETHyd	Ol,Spr Own	WhSpr	[1]	Semi,Mo
716	1,175	30′	20′2″	5′11″	142.6	16.8	3.3	6.0	10.2	9.4	DI	D	D,Fab	Ty	84	Ha7.00x4	HydGr	Ol,Erco	.....		D,Mo
749	2,450	36′	27′8″	7′9″	200.0	16.6	6.9	14.5	26.7	13.2	Sol,Sp	D	Ply	Fx	115		Hy	Ol	Wh		ST,Wl,Fab
090	1,700	24′	16′3″	6′10″	169.4	17.4	.....	.....	12.84	9.3	Sol,Sp	S,D	Fab	*Ty*	*70*	*Shn,Lp6.00x6*	*Sh,Mech*	*O,Spr*	.....		*D,Mo*
090	*1,700*	*24′*	*16′3″*	*6′10″*	*169.4*	*17.4*	.....	.....	*12.84*	*9.3*	*Sol,Sp*	*S,D*	*Fab*	*Ty*	*70*	*Shr,Lp600.x6*	*Sh,Mech*	*O,Spr*	.....		*D,Mo*
300	2,456	35′9⅜″	23′4″	7′3″	185.0	13.02	12.58	10.9	21.2	17.12	D	Me	D	Re	91	21″ Sl,Gen	Hyd	Acp,Ol	Wh		AD,Ru
950	2,600	35′9⅜″	23′9″	7′8″	*185.0*	*13.02*	*12.58*	*10.9*	*21.2*	*17.12*	*D*	*Me*	*D*	*Re*	*91*	*21″ Sl,Gen*	*Hyd*	*Acp,Ol*	*Wh*		*AD,Ru*
350	2,000	34′	26′6⅜″	7′3″	*179.5*	*20.2*	*9.2*	*6.7*	*10.7*	*11.9*	*Box,Sp*		*Ply* [22]	*Fx*	*113½*	*Gen 8.00x5*	*Gen,Hyd*	*Spr,Hyd*	*Wh*		*S,Wl,Fab*
...	1,150	35′6″	23′8″	7′5″	173.8	.....	4.7	7.0	13.0	9.8	Spr	Me	Fab	Fx	.....	Shn, 6.00x6	Sh,Hyd	Ol,In,St	6.00x2 Strble		.....
700	*1,200*	*35′6″*	*23′2″*	*7′5″*	*173.8*	.....	*4.7*	*7.0*	*13.0*	*9.8*	*Spr*	*Me*	*Fab*	*Fx*	.....	*Shn,6.00x6*	*Sh,Hyd*	*Ol,In,St*	*6.00x2 Strble*		.....
700	*1,200*	*35′6″*	*23′2″*	*7′5″*	*173.8*	.....	*4.7*	*7.0*	*13.0*	*9.8*	*Spr*	*Me*	*Fab*	*Fx*	.....	*Shn,6.00x6*	*Sh,Hyd*	*Ol,In,St*	*6.00x2 Strble*		.....
700	*1,225*	*36′*	*21′9″*	*6′8″*	*185.0*	*16.0*	*6.0*	*6.8*	*20.0*	*12.5*	*Lmd,Sp*	*Sp*	*Fab*	*Fx*	*73*	*Aw 16x7–3*	*Mech*	*Sc*	*Wh*		*Sp,G,Ply*
830	2,250	40′	28′10″	10′3″	55.24	.....	12.0	3.2	22.0	.....	ST	Ply	Pl,Fab	Fx	114.5	7.00x5 Gr	Mech,Ha	Ol,Bx	Wh		ST,Wl,Fab
800	2,245	40′	28′10″	10′3″	55.24	.....	12.0	3.2	22.0	.....	ST	Ply	.....	Fx	114.5	7.00x5 Gr	Mech,Ha	Ol,Bx	Wh		ST,Wl,Fab
650	1,200	35′	20′	5′10½″	140.0	13.0	4.9	5.65	13.0	8.75	DI	D	Fab	Ol	76	Fi 16–6	Sh,Mech	Ol,Own	Spr		AD,MO
791	1,260	35′	21′4″	8′	140.0	13.0	4.9	5.65	13.0	8.75	DI	D	Fab	.....	.....	.....	.....	.....	.....		AD,Mo
650	1,200	35′	20′	5′10½″	140.0	13.0	4.9	5.65	13.0	8.75	DI	D	Fab	Ol	76	Fi 16–6	Sh,Mech	Ol,Own	Spr		AD,Mo
720	1,200	35′	20′	5′10½″	140.0	13.0	4.9	5.65	13.0	8.75	DI	D	Fab	Ol	76	Fi 16–6	Sh,Mech	Ol,Own	Wh		AD,Mo
720	1,610	32′	20′6″	6′11″	132.2	13.5	4.1	5.8	10.6	9.2	Sol,Sp	W	Fab	Fx	87.5	GoAirWheels	Go	Sc	Wh		ST,Wl,Fab
773	1,610	32′	20′6″	6′11″	132.2	13.5	4.1	5.8	10.6	9.2	Sol,Sp	W	Fab	Fx	87.5	EH 6.50x10	EH,Mech	Sc	Wh		ST,Wl,Fab
845	1,630	23′2½″	20′5″	6′6″	94.0	16.0	3.5	5.0	10.0	7.0	Sol,Sp	W	Fab	Fx	75	EH 6.50x10	EH,Mech	Sc	Wh		ST,Wl,Fab
810	*1,150*	*30′*	*21′8″*	*6′8″*	*135.0*	*14.0*	*5.1*	*6.8*	*13.5*	*8.8*	*AD* [26]	*D*	*Fab*	*Fx*	*84*	*Fi 6.00x6*	*Sh,Hyd*	*Sc*	*Wh*		*Mo,A.D*
850	*1,220*	*30′*	*21′8″*	*6′8″*	*135.0*	*14.0*	*5.1*	*6.8*	*13.5*	*8.8*	*AD* [26]	*D*	*Fab*	*Re*	*72*	*Fi 6.00x6*	*Sh,Hyd*	*Sc*	*Wh*		*Mo,A.D*
975	2,170	32′6″	24′	7′8″	168.0	.....	.....	.....	.....	.....	AD	AD	AD	Fx	80	Aut 6.50x10	He,Hyd	Air,Ki	Pn		Stiff,Skin
974	1,000	35′2½″	22′5″	6′8″	178.5	19.2	4.02	6.55	14.65	10.64	Sol,Sp	D	Fab	Fx	71	Ha 8.00x4	Hyd,Pal [15]	Ru	Sk [86]		ST,Wl,Fab
000	1,100	35′2½″	22′6½″	6′8″	178.5	19.2	4.02	6.55	14.65	10.64	Sol,Sp	D	Fab	Fx	71	Ha 8.00x4	Hyd,Pal [15]	Ru	Sk [86]		ST,Wl,Fab
000	1,100	35′2½″	22′6½″	6′8″	178.5	19.2	4.02	6.55	14.65	10.64	Sol,Sp	D	Fab	Fx	71	Ha 8.00x4	Hyd,Pal [15]	Ru	Sk [86]		ST,Wl,Fab
990	1,100	35′2½″	22′3″	6′8″	178.5	19.2	4.02	6.55	14.65	10.64	Sol,Sp	D	Fab	Fx	71	Ha 8.00x4	Hyd,Pal [15]	Ru	Sk [86]		ST,Wl,Fab
990	1,100	35′2½″	22′3″	6′8″	178.5	19.2	4.02	6.55	14.65	10.64	Sol,Sp	D	Fab	Fx	71	Ha 8.00x4	Hyd,Pal [15]	Ru	Sk [86]		ST,Wl,Fab
000	1,400	36′2″	22′6″	6′10″	183.0	19.2	4.66	6.76	14.66	10.64	D	D	Fab	Fx	77	Ha 8.00x4	Hyd,Pal	Ol	FuSw Wh		ST,Wl,Fab
000	1,301	36′2″	22′6″	6′10″	183.0	19.2	4.66	6.76	14.66	10.64	Sol,Sp	D	Fab	Fx	77	Ha 8.00x4	Hyd.Pal	Ol	FuSw Wh		ST,Wl,Fab
850	1,450	35′5½″	22′6″	6′10″	179.0	19.2	4.02	6.76	14.65	10.64	Sol,Sp	D	Fab	Fx	74½	Ha 8.00x4	Hyd,Pal	Ru	FuSw		ST,Wl,Fab
850	1,450	35′5½″	22′6″	6′10″	179.0	19.2	4.02	6.76	14.65	10.64	Sol,Sp	D	Fab	Fx	74½	Ha 8.00x4	Hyd,Pal	Ru	FuSw		ST,Wl,Fab
890	1,100	35′2½″	22′3″	6′8″	178.5	19.2	4.02	6.55	14.65	10.64	Sol,Sp	D	Fab	Fx	71	Ha 8.00x4	Hyd,Pal [15]	Ru	Sk [13]		ST,Wl,Fab
925	*2,050*	*43′0″* [33]	*20′5″*	*10′3½″*	*1452* [34]	.....	*24.4*	*5.2*	*12.4*	*5.4* [35]	*ST* [36]	*Ply*	*Ply*	*Ol* [37]	*84*	*Bz 20x4* [38]	*Bz,Hyd*	*Bz,Pn,Ol*	*Pn,Ol*		.....
975	1,108	34′9″	22′7½″	7′	168.8	19.1	6.38	6.84	10.57	11.0	Sp	Sp	Fab	18	69	Shinn 6.00x6	Mech,Sh	17	Spr		Wl,ST,Fab
975	1,160	34′9″	22′7½″	7′	168.8	19.1	6.38	6.84	10.57	11.0	Sp	Sp	Fab	18	69	Shinn 6.00x6	Mech,Sh	17	Spr		Wl,ST,Fab
975	1,160	34′9″	22′7½″	7′	168.8	19.1	6.38	6.84	10.57	11.0	Sp	Sp	Fab	18	69	Shinn 6.00x6	Mech,Sh	17	Spr		Wl,ST,Fab
975	*1,200*	*34′9″*	*22′7½″*	*7′*	*168.8*	*19.1*	*6.39*	*6.84*	*10.57*	*11.0*	*Sp*	*Sp*	*Fab*	*18*	*69*	*Shinn 6.00x6*	*Mech,Sh*	17	*Spr*		*Wl,ST,Fab*
020	*1,326*	*32′*	*22′1½″*	*6′8¾″*	*147.0*	*17.6*	*6.5*	*7.3*	*13.2*	*9.55*	*Sp*	*Sp*	*Fab*	*18*	*69.5*	*Shinn 6.00x6*	*Mech,Sh*	*RuR*	*Spr*		*Wl,ST,Fab*
026	1,326	32′	20′3″	6′8¾″	147.0	17.16	5.16	6.33	13.2	9.55	Sp	Sp	Fab	18	69.5	Shinn 6.00x6	Mech,Sh	RuR	Spr		Wl,ST,Fab
053	1,460	35′	22′3″	6′9″	166.0	19.75	5.17	6.92	15.04	12.12	Sol,Sp	Sp	Fab	Fx	72	Go 18x8–3	Go,Mech	Hyd	Sk		ST,Wl,Fab
030	1,460	35′	22′3″	6′9″	166.0	19.75	5.17	6.92	15.04	12.12	Sol,Sp	Sp	Fab	Fx	72	Go 18x8–3	Go,Mech	Hyd	Wh		ST,Wl,Fab
061	1,460	35′	22′3″	6′9″	166.0	19.75	5.17	6.92	15.04	12.12	Sol,Sp	Sp	Fab	Fx	72	Go 18x8–3	Go,Mech	Hyd	Sk		ST,Wl,Fab
070	1,700	32′	22′10″	6′10.5″	143.2	13.13	10.3	6.0	15.68	9.8	Sol,Sp	Sp	Fab	Fx	80	Go 18x8–3	Go,Mech	Hyd	Wh		ST,Wl,Fab
030	1,635	34′1¾″	21′6″	7′4″	161.8	13.13	8.45	5.75	13.94	11.56	Sol,Sp	Sp	Fab	Fx	80	Go 18x8–3	Go,Mech	Hyd	Wh		ST,Wl,Fab
070	1,734	34′1¾″	21′6″	7′4″	161.8	13.13	8.45	5.75	13.94	11.56	Sol,Sp	Sp	Fab	Fx	80	Go 18x8–3	Go,Mech	Hyd	Wh		ST,Wl,Fab
030	1,800	34′1¾″	21′6″	7′4″	161.8	13.13	12.0	5.75	13.94	11.56	Sol,Sp	Sp	Fab	Fx	80	Go 18x8–3	Go,Mech	Hyd	Wh		ST,Wl,Fab
650	*1,350*	*34′*	*21′9″*	*6′7″*	*164.6*	*8.42*	*8.94*	*5.91*	*14.76*	*10.88*	*Sol,Sp*	*Sp*	*Fab*	*Fx*	*72*	*Sh*	*Sh,Mech*	*Hyd*	*Wh*		*ST,Wl,Fab*
650	1,350	34′	21′9″	6′7″	164.6	8.42	8.94	5.91	14.76	10.88	Sol,Sp	Sp	Fab	Fx	72	Sh	Sh,Mech	Hyd	Wh		ST,Wl,Fab
010	*1,350*	*34′*	*21′9″*	*6′7″*	*164.6*	*8.42*	*8.94*	*5.91*	*14.76*	*10.88*	*Sol,Sp*	*Sp*	*Fab*	*Fx*	*72*	*Sh*	*Sh,Mech*	*Hyd*	*Wh*		*ST,Wl,Fab*
015	*1,350*	*34′*	*21′9″*	*6′7″*	*164.6*	*8.42*	*8.94*	*5.91*	*14.76*	*10.88*	*Sol,Sp*	*Sp*	*Fab*	*Fx*	*72*	*Sh*	*Sh,Mech*	*Hyd*	*Wh*		*ST,Wl,Fab*
018	940	30′	20′	7′	147.0	13.5	3.85	5.67	15.12	10.32	Sp	Sp	Fab	Fx	55	16x7–3 or 7–4	.....	Air,Whl	Sk		Wl,ST,Fab
018	*940*	*30′*	*20′*	*7′*	*147.0*	*13.5*	*3.85*	*5.67*	*15.12*	*10.32*	*Sp*	*Sp*	*Fab*	*Fx*	*55*	*16x7 or 7–4*	.....	*Air,Whl*	*Wil* [41]		*Wl,ST,Fab*
045	2,150	57′6″	25′4	6′10″	202.0	16.2	5.1	6.6	14.3	11.3	SMe	D	AD,Fab	Fx	96¾	Go 18x8–3	Go,Mech	Ol	Wh		D,Mo
031	1,600	29′11″	21′5⅝″	6′11″	124.0	12.0	4.7	7.2	12.0	10.0	Sol,Sp	D	Fab	Fx	66	Go 18x8–3	Go,Mech	Ol	Wh		D,Mo
033	1,600	29′11″	21′5⅝″	6′11″	124.0	12.0	4.7	7.2	12.0	10.0	Sol,Sp	D	Fab	Fx	66	Go 18x8–3	Go,Mech	Ol	Wh		D,Mo
000	1,900	35′10″	25′	7′8″	187.0	19.6	7.6	7.2	19.2	13.6	Lmd,Sp	Sp	Fab [10]	Fx	96	Aut. 10x6.5	Aut	Ol,Pas	Wh		ST,Wl,Fab,D
070	2,790	34′1″	25′2″	9′6″	304.5	25.22	6.79	10.22	19.28	20.62	Sp,I	Sp, Ply	Fab	*Fx*	*90.16*	*Sl 24*	*Hyd*	*Hyd*	*Hyd*		*T, Al, Fab*
070	2,790	34′1″	25′2″	9′6″	304.5	25.22	6.79	10.22	19.28	20.62	Sp,I	Sp, Ply	Fab	*Fx*	*90.16*	*Sl 24*	*Hyd*	*Hyd*	*Hyd*		*T,Al,Fab*
070	2,790	34′1″	25′2″	9′6″	304.5	25.22	6.79	10.22	19.28	20.62	Sp,I	Sp, Ply	Fab	*Fx*	*90.16*	*Sl 24*	*Hyd*	*Hyd*	*Hyd*		*T,Al,Fab*
018	*1,146*	*30′*	*22′3″*	*6′5½″*	*132.0*	*14.58*	*4.82*	*6.27*	*11.94*	*11.22*	*Sol,Sp*	*W*	*Fab*	....	*67*	*6.00x6*	*Sh*	*SC*	*SprWh*		*WLS*
055	*2,770*	*33′10″*	*26′3″*	*9′5″*	*297.0*	.....	.....	.....	.....	.....	*D*	*DT*	*Fab*	[43]	.....	*Sl 24*	*Bz,Hyd*	*Aer*	*Aer*		*Mo*
098	*2,012*	*30′0″*	*24′9″*	*7′10″*	*157.0*	.....	.....	.....	.....	.....	*SMB*	*D*	*Fab*	[43]	.....	*7.00x5*	*Gen,Hyd*	[44]		[44]	*Mo & T,Tra*
054	*1,625*	*34′*	*21′8″*	*6′6″*	*155.0*	*18.02*	*8.41*	*6.76*	*14.20*	*10.75*	*Sol,Sp*	*Rd*	*Fab*	*Fx*	*84*	*Ha 6.00x6*	*Gr,Hyd*	*Spr,Ol*	*Wh*		*ST,Wl,Fab*
018	*1,625*	*34′*	*21′8″*	*6′6″*	*155.0*	*18.02*	*8.41*	*6.76*	*14.20*	*10.75*	*Sol,Sp*	*Rd*	*Fab*	*Fx*	*84*	*Ha 6.00x6*	*Gr,Hyd*	*Spr,Ol*	*Wh*		*ST,Wl,Fab*
025	*1,350*	*27′*	*22′*	*7′4″*	*120.0*	*10.0*	*5.5*	*7.6*	*12.1*	*8.1*	*Pl,Sp* [15]	*Ply* [15]	*Ply* [15]	*Ru*	*80*	*6.00x6*	*Ha,Hyd*	*Hyd,Spr*	*Wh*		.....
050	1,150	36′	22′	6′8″	169.0	— —	.....	.....	.....	.....	Sol,Sp	Me	Fab	.....	.....	.....	.....	Sc	Wh		ST,Wl,Fab
052	1,150	36′	22′	6′10″	169.0	— —	.....	.....	.....	.....	Sol,Sp	Me	Fab	.....	.....	.....	.....	Sc	Sk		ST,Wl,Fab
000	1,200	36′	22′	6′10″	169.0	.....	.....	.....	.....	.....	Sol,Sp	Me	Fab	.....	.....	.....	.....	.....	Wh		ST,Wl,Fab
000	1,200	36′	22′	6′10″	169.0	.....	.....	.....	.....	.....	Sol,Sp	Me	Fab	.....	.....	.....	.....	.....	Wh		ST,Wl,Fab
000	*1,200*	*36′*	*22′*	*6′10″*	*169.0*	.....	.....	.....	.....	.....	*Sol,Sp*	*Me*	*Fab*	.....	.....	.....	.....	.....	*Wh*		*ST,Wl,Fab*
071	*2,450*	*36′*	*25′5½″*	*10′6″*	*182.25*	*20.30*	*7.15*	*9.35*	*17.62*	*16.66*	*Box* [45]	*Trs* [46]	[14]	*Fx*	*132*	*7.00x8, Aw*	*Sh,Hyd*	*Bz,Ol*	*Hyd*		*W,Sp* [46]
000	*2,400*	*36′*	*25′5½″*	*10′6″*	*182.25*	*20.75*	*12.1*	*9.35*	*24.66*	*16.66*	*Box* [45]	*Trs* [46]	[14]	*Fx*	*109¼*	*7.00x8, Aw*	*Sh,Hyd*	*Bz,Ol*	*Hyd*		*W,Sp* [46]
054	2,650	30′	23′1″	8′6″	243.6	.....	.....	.....	.....	.....	Sp	Sp	Fab	....	101	8.50x10	Ha,Hyd	Waco,Ol	Wh		.....
079	2,650	30′	23′1″	8′6″	243.6	.....	.....	.....	.....	.....	Sp	Sp	Fab	....	101	8.50x10	Ha,Hyd	Waco,Ol	Wh		.....
093	*2,650*	*30′*	*23′1″*	*8′6″*	*243.6*	.....	.....	.....	.....	.....	*Sp*	*Sp*	*Fab*	.....	*101*	*8.50x10*	*Ha,Hyd*	*Waco,Ol*	*Wh*		.....
052	1,916	34′5¼″	24′6¼″	7′2½″	195.0	.....	.....	.....	.....	.....	Sp	W	Fab	Fx	.....	.....	.....	.....	Wh		.....
028	950	34′4″	20′6″	7′	138.0	18.92	11.2	9.13	14.4	11.2	Sp,I	Bass-	Fab	Fx	56½	Welch 16x7	None	Solid	Wh		ST,Wl,Fab
028	954	34′4″	21′1″	7′	138.0	18.92	11.2	9.13	14.4	11.2	Sp,I	Bass-	Fab	Fx	56½	Welch 16x7	None	Solid	Wh		ST,Wl,Fab
000	*950*	*36′*	*20′9″*	*7′*	*150.0*	*18.92*	*11.2*	*9.13*	*14.4*	*11.2*	*Sp,L*	*Bass-*	*Fab*	*Fx*	*56½*	*Welch 16x7*	*None*	*Solid*	*Steer.*		*ST,Wl,Fab*
038	*950*	*34′4″*	*20′2″*	*7′*	*148.0*	*18.92*	*19.3*	*9.08*	*14.4*	*11.2*	*Sp,I*	*Bass-*	*Fab*	*Fx*	*56½*	*Welch 16x7*	*None*	*Solid*	*Wh*		*ST,Wl,Fab*
025	950	34′4″	20′6″	7′	148.0	18.92	11.2	9.13	14.4	11.2	Sp,L	Bass-	Fab	Fx	56½	Welch 16x7	None	Solid	Wh		ST,Wl,Fab
050	*1,000*	*34′4″*	*20′6″*	*7′*	*148.0*	*18.92*	*19.2*	*9.08*	*14.4*	*11.2*	*Sp,I*	*Bass*	*Fab*	*Fx*	*56½*	*Welch 16x7*	*None*	*Solid*	*Steer.*		*ST,Wl,Fab*
055	*1,400*	*30′*	*20′*	*6′8″*	*146.0*	*12.0*	*5.2*	*6.5*	*10.7*	*12.32*	*Sol,Sp*	*Sp*	*Me,Fab, Ply*	*Fx*	*96*	*Sh 6.00x6*		[9]	*Wh* [10]		.....
...	2,243	31′	24′5¾″	8′9″	242.5	27.6	.....	.....	.....	.....	Sp	Sp	Fab	Fx	.....	6.50x10	Go,Hyd	Ol	W		Fab

Key to Abbreviations

(Footnotes on bottom of table on pages 109-110)

- • —Approved on floats
- A —Amphibian
- Acp —Aircraft Prod
- AD —Alclad
- Aer —Aerol
- Al —Aluminum
- Aln —Allison
- Apl —Applied for
- Ar- —Aeronca
- Aut —Autofan
- Aw —Air Wheels
- B —Biplane
- Bo —Bolted
- Box —Box spar
- Bx —Bendix
- C —Closed [3]
- CG —Coast Guard
- Con —Continental
- Crit —Critical
- Cy —Cyclone
- Cyy —Two row Cyclone
- D —Aluminum Alloy
- E.H. —Ebert Hatch
- F —Flying Boat
- Fab —Fabric
- Fl —Floats
- Fo —Ford
- Fr —Franklin
- Fx —Fixed
- G —Glued
- Gen —General
- Go —Goodyear
- Gr —Goodrich
- Gy —Autogiro
- Ha —Hayes
- Yyd —Hydraulic
- I —"I" section
- Id —Inverted
- Ja —Jacobs
- K —Kinner
- Kr —Ken Royce
- L —Landplane
- Lam —Lambert
- LeB —LeBlond
- Len —Lenape
- Lmd —Laminated
- Lp —Low Pressure
- Ly —Lycoming
- M —Monoplane
- Me —Metal
- Mech —Mechanical
- Men —Menasco
- Mil —Military
- Mo —Monocoque
- Mu —Multicelfular
- O —Open
- Ol —Oleo
- Op —Optional
- Pal —Palmer
- Ply —Plywood
- Pn —Pneumatic
- Pob —Pobjoy
- Pwh —P & W Hornet
- Pwj —P & W Wasp, Jr[4]
- Pwwj —P & W Twin Wasp, Jr.
- Pww —P & W Wasp
- Pwww —P & W Twin Wasp
- Q —Sesquiplane
- Ran —Ranger
- Re —Retractable
- Ri —Lord Instrument Mounting
- Rm —Lord Engine Mounting
- RW —Retractable Wheel
- Ro —Routed
- Ru —Rusco
- Rv —Riveted
- S —Steel
- Sc —Shock cord
- Se —Security
- Sk —Skid
- Sl —Streamline
- S.L. —Sea Level
- Sh —Shinn
- S.M.B. —Single metal box
- Sol —Solid
- Sp —Spruce
- Spr —Spring
- SS —Stainless Steel
- Stu —Studebaker
- Sz —Szekly
- T —Tubing
- Trs —Truss
- Ty —Tricycle
- W —Wood
- War —Warner
- Wel —Welch
- Wh —Wheel
- Wl —Welded
- Wr —Wright
- Ww —Whirlwind

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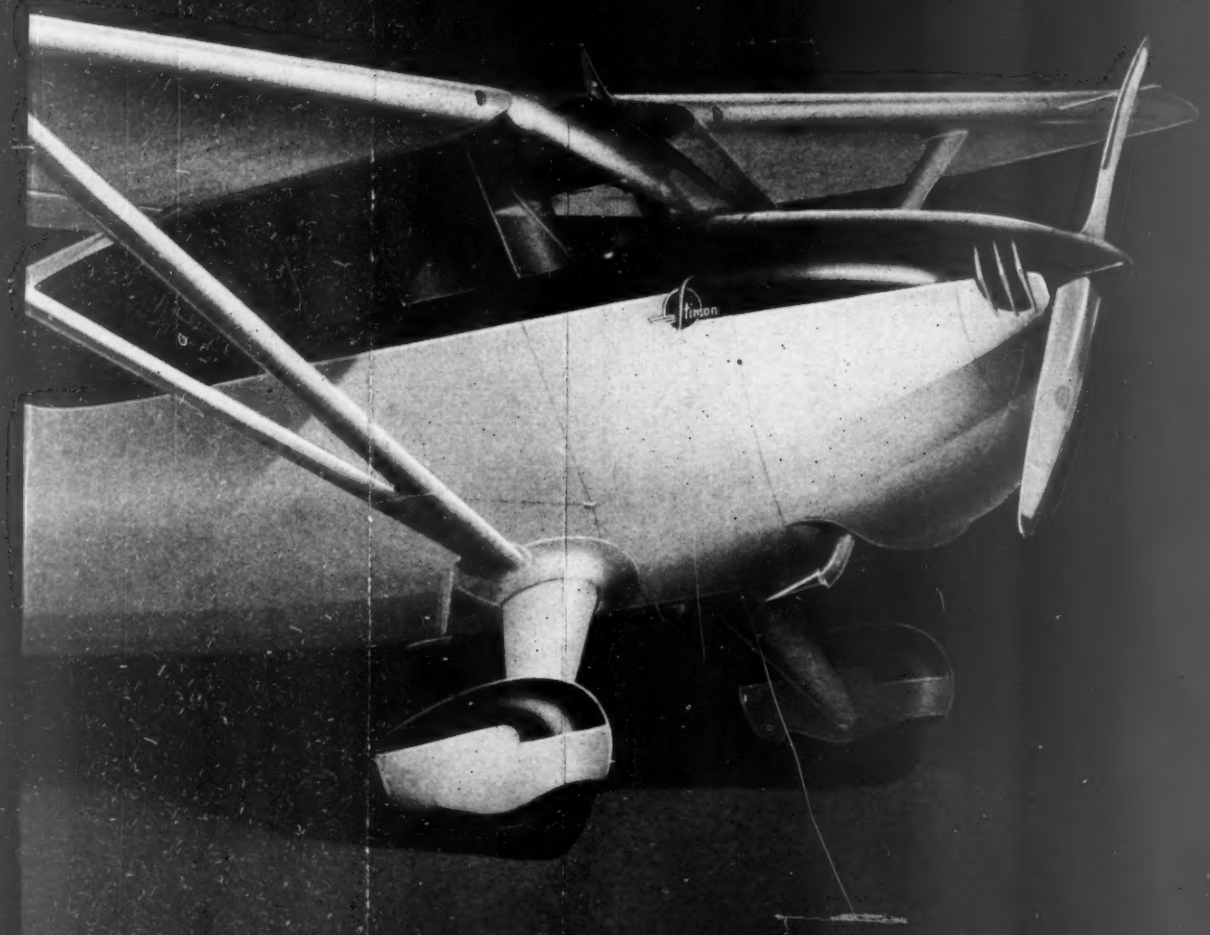

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4–5 Seats

Manufacturer	Designation or Model No.	A.T.C. number	Price at factory, $	Type	Number of seats	
			General			
Beech Aircraft Corp	D-17R	638		CBL[3]	5	Wr
Beech Aircraft Corp	D-17A	713		CBL[3]	5	Wr
Beech Aircraft Corp	D-17S	649		CBL[3]	5	Pw
Beech Aircraft Corp	E-17B	641		CBL[3]	5	Ja
Beech Aircraft Corp	F-17D	689		CBL[3]	5	Ja
Cessna Aircraft Co	C-145	701		CML[49]	4	Wr
Cessna Aircraft Co	C-165	701		CML[49]	4	Wr
Cessna Aircraft Co	T-50 Twin	722		CML[49]	5	2J
Colgate-Larsen Aircraft Company	*Experimental CL-15*			*A* *	*4*	*Ra*
Fairchild Aircraft	F-24, W-40	707		CML*	4	Wr
Fleetwings, Inc	*F-5*			*CMA*	*4*	*Ja*
Fleetwings, Inc	F-501	680		J		Ja
Fleetwings, Inc	F-501[54]	680				Ja
Grumman Aircraft Engr. Corp	*Widgeon*			*CMA*	*5*	*2R*
Harlow Aircraft Co	PJC-2	659		CLM	4	Wr
Howard Aircraft Corp	*DGA-15P*		*On req.*	*CML*	*5*	*Pu*
Howard Aircraft Corp	*DGA-15J*		*On req.*	*CML*	*5*	*Ja*
Howard Aircraft Corp	DGA-15W	717	On req.	CML	5	Wr
Monocoupe Corp	*Twin Monocoach-H*			*CML*	*4–5*	*2L*
Ong Aircraft Corp	*M-32W*		*6,485*	*CML*	*4*	*Wa*
Ong Aircraft Corp	*M-32*			*CML*	*4*	*Me*
Ong Aircraft Corp	*M-32W1*			*CML*	*4*	*Wa*
Stinson Aircraft	*SR-10J*			*CML*	*4–5*	*Ly*
Stinson Aircraft	SR-10K	679		CML*	4–5	Wr
Waco Aircraft Co	*HRE*			*CBL*	*5*	*Ly*
Waco Aircraft Co	*ARE*		*13,500*	*CBL*	*5*	*Ja*
Waco Aircraft Co	SRE	714	17,800	CBL	5	Pw
Waco Aircraft Co	*WRE*		*17,200*	*CBL*	*5*	*Wr*
Waco Aircraft Co	YKS	*626	7,110	CBL	5	Ja
Waco Aircraft Co	ZKS	*626	7,890	CBL	5	Ja
Waco Aircraft Co	VKS	*648	7,070	CBL	5	Co
Waco Aircraft Co	AVN	677	12,800	CBL	5	Ja
White Aircraft Corp	New Standard D-25	108		OLB	5	Wr

6 or more Seats

Air Transport Mfg. Co., Ltd	T-6	223		CML	6	3-
Air Transport Mfg. Co., Ltd	*B-8*			*CML*	*8*	*2W*
Beech Aircraft Corp	18-A	630		CML[3]	6–8	2W
Beech Aircraft Corp	18-S	710		CML[3]	8–9	2P
Bellanca	Aircruiser Cargo	563		CQL	15	Wr
Bellanca	Sr. Skyrocket	565		CML	6	Pw
Bellanca	Sr. Pacemaker Tr	578		CML	8	Wr
Boeing Aircraft Co	314	704		CMF	89	4W
Boeing Aircraft Co	307-B Stratoliner	726		CML	38	4W
Central Aircraft Corp	*UB-14*			*CML*	*14*	*2P*
Central Aircraft Corp	*CB-34*			*CML*	*34*	*3W*
Consolidated Aircraft Corp	*28 Com. Amphibian*			*CMA*	*17 20*	*2P*
Consolidated Aircraft Corp	*28 Com. Flying Boat*			*CMF*	*17 24*	*2P*
Consolidated Aircraft Corp	*29 Com. Flying Boat*			*CMF*	*18 30*	*4P*
Consolidated Aircraft Corp	*31 Com. Flying Boat*			*CMF*		*2W*
Consolidated Aircraft Corp	32 Landplane Transport			CML	17 21	4P
St. Louis Airplane Div., Curtiss-Wright	*Curtiss-Wright Transport*			*CML*	*36*	*2W*
						Do
St. Louis Airplane Div., Curtiss-Wright	*20-C Com. Cargo Transp.*			*CML*	*19*	*2W*
						Do
Douglas Aircraft Co., Inc	DC-3	618		CML	21	2W
Douglas Aircraft Co., Inc	DC-3	669		CML	21	2P
Douglas Aircraft Co., Inc	*DC-4*			*CML*	*40–42*	*4P*
Grumman Aircraft Engineering Corp	G-21A	654		CMA	8	Pw
Lockheed Aircraft Corp	18–10 (S1C3-6)	723		CLM	17	2P
Lockheed Aircraft Corp	18–14 (S4C46)	723		CLM	17	2P
Lockheed Aircraft Corp	18–40 (102A)	723		CLM	17	2W
Lockheed Aircraft Corp	*18–50 (202A)*			*CLM*	*17*	*2W*
Lockheed Aircraft Corp	*18–56 (205A)*			*CLM*	*17*	*2W*
Lockheed Aircraft Corp	*144–14 (S4C4-6)*			*CLM*	*40*	*2P*
Lockheed Aircraft Corp	*144–55*			*CLM*	*40*	*4W*
Lockheed Aircraft Corp	Electra 10A	551		CML	12	2P
Lockheed Aircraft Corp	Electra 10E	590		CML	12	2P
Lockheed Aircraft Corp	Model 12A	616		CML	8	2P
Glenn L. Martin Co	156-C	697		CMF	53	4W
Vought-Sikorsky Div., United Aircraft	S-42-B	592		CMF	37	4P
Vought-Sikorsky Div., United Aircraft	S-43	593		CMA	18	2P
Vought-Sikorsky Div., United Aircraft	S-43-B	593		CMA	18	2P
Vought-Sikorsky Div., United Aircraft[66]	*VS-44-A*			*CMF*	*32*	*4P*

Key to Abbreviations Used in All Aircraft Specification Tables

*	— Approved on floats	CG	— Coast Guard	Gr	— Goodrich	M	
A	— Amphibian	Con	— Continental	Gy	— Autogiro	Me	
Acp	— Aircraft Prod	Crit	— Critical	Ha	— Hayes	Mec	
AD	— Alclad	Cy	— Cyclone	Hyd	— Hydraulic	Men	
Aer	— Aerol	Cyy	— Two row Cyclone	I	— "I" section	Mil	
Al	— Aluminum	D	— Aluminum Alloy	Id	— Inverted	Mo	
Aln	— Allison	E.H.	— Ebert Hatch	Ja	— Jacobs	Mu	
Apl	— Applied for	F	— Flying Boat	K	— Kinner	O	
Ar-	— Aeronca	Fab	— Fabric	Kr	— Ken Royce	Ol	
Aut	— Autofan	Fl	— Floats	L	— Landplane	Op	
Aw	— Air Wheels	Fo	— Ford	Lam	— Lambert	Pal	
B	— Biplane	Fr	— Franklin	LeB	— LeBlond	Ply	
Bo	— Bolted	Fx	— Fixed	Len	— Lenape	Pn	
Box	— Box spar	G	— Glued	Lmd	— Laminated	Pob	
Bx	— Bendix	Gen	— General	Lp	— Low Pressure	Pwb	
C	— Closed	Go	— Goodyear	Ly	— Lycoming	Pwj	
						Pww	

Aviation's Civil Aircraft Specifications (Cont'd)

AVIATION does not assume responsibility for the figures given

Price at factory, $	Type	Number of seats	Make of engine	Power Plant: Total rated h.p.	At altitude, ft.	Fuel capacity (gal.)	Normal range (mi.)	Fuel consumption at cruising speed (gal. per hr.)	Propeller diameter—(in.)	Performance: High speed (m.p.h.)	At altitude, ft.	Cruising speed (m.p.h.)	At altitude, ft.	Stalling speed (m.p.h.)	Climb at sea level (ft. per m.)	Service ceiling (ft.)	Weights: Wing loading (lb. per sq. ft.)	Power loading (lb. per h.p.)	Weight empty	Gross weight (lb.)	Dimensions: Span	Length overall	Height overall	Area—(Sq. Ft.): Wing (including ailerons)	Ailerons (total)	Fin	Rudder	Stabilizer	Elevators (total)	Wing: Spars	Ribs
.....	CBL[3]	5	Wr,Ww	450	S.L.	[4] 101	[3] 670	23.0	99	211	S.L.	202	9,700	50	1,400	23,000	14.17	10.0	2,622	4,250	32′0″	26′10 11/16″	8′	296.5	23.75	6.56	8.7	24.5	16.6	Sp,Sol	Sp
.....	CBL[3]	5	Wr,Ww	320	S.L.	[4] 98	[3] 820	17.0	99	178	S.L.	170	9,600	50	1,100	15,500	14.17	13.1	2,517	4,250	32′	26′7 1/4″	8′	296.5	23.75	6.56	8.7	24.5	16.6	Sp,Sol	Sp
.....	CBL[3]	5	Pwj	450	S.L.	[4] 101	[3] 670	23.0	99	211	S.L.	202	9,700	50	1,500	25,000	14.17	10.5	2,605	4,250	32′	25′11 1/4″	8′	296.5	23.75	6.56	8.7	24.5	16.6	Sp,Sol	Sp
.....	CBL[3]	5	Ja	285	S.L.	[5] 75	[3] 600	17.0	93	185	S.L.	177	7,200	45	1,200	18,000	11.3	11.7	2,165	3,390	32′	25′11 1/2″	8′	296.5	23.75	5.54	8.7	23.7	15.1	Sp,Sol	Sp
.....	CBL[3]	5	Ja	330	3,700	[5] 75	[3] 600	17.0	99	190	S.L.	182	10,000	46	1,300	18,000	11.9	10.7	2,255	3,590	32′	25′11 1/2″	8′	296.5	23.75	5.54	8.7	23.7	15.1	Sp,Sol	Sp
.....	CML[49]	4	War,Ri	145	S.L.	[50] 35	525	9.5	84	162	S.L.	151	8,200	49	1,000	18,000	13.5	16.9	1,380	2,450	34′2″	24′8″	7′0″	181.0	12.35	7.1	6.11	17.3	13.0	Lmd,Sp	Sp
.....	CML[49]	4	War,Ri	165	S.L.	[50] 35	485	10.8	86	[24] 165	S.L.	157	8,200	49	1,125	19,300	13.5	14.8	1,400	2,450	34′2″	25′0″	7′0″	181.0	12.35	7.1	6.11	17.3	13.0	Lmd,Sp	Sp
.....	CML[49]	5	2Ja,Ri	450	S.L.	[51] 120	750	28.0	93	195	S.L.	191	7,500	55	1,525	22,000	17.3	11.3	3,600	5,100	41′11″	32′9″	9′11″	295.0	18.0	10.9	14.9	40.0	22.7	Lmd,Sp	Sp
.....	*A* *	4	*Ran*	*200*	*S.L.*	*55*	*500*	.....	96	*140*	*S.L.*	*125*	*S.L.*	*50*	*800*	*14,500*	*14.5*	*14.3*	*1,730*	*2,860*	*40′*	*30′10″*	*8′9″*	*197.5*	*16.08*	*14.41*	*9.98*	*18.58*	*10.30*	*Box type 30% chord*	*Full web*
.....	CML*	4	War[28]	145	S.L.	60	720	9.5	86	135	S.L.	122	7,000	50	720	15,700	13.2	17.58	1,482	2,550	36′4″	23′9″	8′	193.3	21.0	6.1	10.1	21.9	13.5	Sol,Sp	Sp
.....	*CMA*	4	*Ja*[28]	*285*	*S.L.*	*70*	*560*	*18.0*	*102*	*160*	*S.L.*	*144*	*S.L.*	*61*	*950*	*15,000*	*14.7*	*12.1*	*2,320*	*3,450*	*40′6″*	*32′0″*	*12′6″*	*235.0*	*23.3*	*18.9*	*12.5*	*8.7*	*15.1*	*SS,Wl*	*SSW*
.....	J	...	Ja	300	S.L.	70	516	18.0	102	150	S.L.	135	.....	58	914	14,000	15.96	12.5	2,453.7	3,750	40′6″	32′0″	12′6″	235.0	23.3	18.9	12.5	8.7	15.1	SS,Wl	SSW
.....	.....	...	Ja	300	S.L.	70	516	18.0	102	150	S.L.	139	6,000	59	1,078	14,300	16.0	12.67	2,509.7	3,850	40′6″	32′0″	12′6″	235.0	23.3	18.9	12.5	8.7	15.1	SS,Wl	SSW
.....	*CMA*	5	*2Ran*	*400*	*S.L.*	*108*	*775*	*20.0*	*82*	.....	.....	*150*	*3,000*	*61*	*870*	*15,000*	*18.375*	*11.25*	*3,075*	*4,500*	*40′*	*31′*	*9′*	*245.0*	*14.6*	*12.3*	*14.0*	*25.8*	*19.6*	*D,Box*	*D*
.....	CLM	4	War	145	S.L.	34	480	9.0	84	140	S.L.	135	Max.	52	650	12,000	14.05	17.94	1,750	2,600	35′9 3/4″	23′4″	7′3″	185.0	13.02	12.58	10.9	21.2	17.12	D	Me
a req.	*CML*	5	*Pwj,Rm,Ri*	*400*	*5,000*	*121*	*920*	*24.0*	*99*	*192*	*9,600*	*60*	*1,560*	*21,500*	*20.7*	*10.9*	*2,725*	*4,350*	*38′0″*	*26′1 3/4″*	*8′5″*	*210.0*	*18.54*	*11.72*	*9.62*	*21.27*	*21.20*	*Sol,Sp*	*Sp*
a req.	*CML*	5	*Ja,Rm,Ri*	*300*	*3,700*	*118*	*1,100*	*18.5*	*99*	*178*	*S.L.*	*169*	*6,000*	*60*	*1,000*	*15,500*	*20.7*	*14.5*	*2,500*	*4,350*	*38′0″*	*26′*	*8′5″*	*210.0*	*18.54*	*11.72*	*9.62*	*21.27*	*21.20*	*Sol,Sp*	*Sp*
n req.	CML	5	Wr,Rm,Ri	320	.....	118	1,025	18.5	99	.....	.....	175	8,500	60	1,050	17,500	20.7	13.6	2,500	4,350	38′0″	26′2 1/4″	8′5″	210.0	18.54	11.72	9.62	21.27	21.20	Sol,Sp	Sp
.....	*CML*	4–5	*2Lam*	*180*	*S.L.*	*70*	*862*	*10.0*	*78*	*150*	*S.L.*	*135*	*8,600*	*48*	*560*	*10,800*	*13.9*	*17.9*	*1,882*	*3,220*	*36′*	*24′6″*	*7′10″*	*231.0*	*18.5*	*11.68*	*8.37*	*28.32*	*14.76*	*Sp,Box*	*W*
6,485	*CML*	4	*War*	*145*	*S.L.*	*40*	*580*	*9.5*	*90*	*156*	*S.L.*	*135*	*S.L.*	*50*	*900*	*17,000*	*14.3*	*16.4*	*1,395*	*2,375*	*33′6″*	*26′1″*	*7′5″*	*166.0*	*17.5*	*8.7*	*8.3*	*16.1*	*11.6*	*Sol,Sp*	*Sp*
.....	*CML*	4	*Men*	*150*	*3,000*	*40*	*572*	*10.0*	*84*	*159*	*3,000*	*139*	*3,000*	*50*	*1,000*	*19,000*	*14.3*	*15.8*	*1,325*	*2,375*	*33′6″*	*26′11″*	*7′5″*	*166.0*	*17.5*	*8.7*	*8.3*	*16.1*	*11.6*	*Sol,Sp*	*Sp*
.....	*CML*	4	*War*	*165*	*S.L.*	*40*	*590*	*10.0*	*90*	*164*	*S.L.*	*141*	*S.L.*	*50*	*1,000*	*18,000*	*14.3*	*14.4*	*1,410*	*2,375*	*33′6″*	*26′1″*	*7′5″*	*166.0*	*17.5*	*8.7*	*8.3*	*16.1*	*11.6*	*Sol,Sp*	*Sp*
.....	*CML*	4–5	*Ly,Rm*	*285*	*S.L.*	*100*	*835*	*18.8*	*102*	.....	.....	*155*	*4,000*	*60*	*1,040*	*15,800*	*16.0*	*14.6*	*2,650*	*4,150*	*41′10 1/2″*	*27′10 1/4″*	*8′7″*	*258.5*	*22.02*	*12.0*	*15.16*	*25.08*	*19.75*	*ST,Wl,Trs*	*Ru,*
.....	CML*	4–5	Wr,Ww,Rm	420	1,400	100	610	27.0	102	.....	.....	172.5	5,500	62	1,450	19,400	18.0	11.1	3,045	4,650	41′10 1/2″	28′3″	8′7″	258.5	22.02	12.0	15.16	25.08	19.75	ST,Wl,Trs	Ru,I
.....	*CBL*	5	*Ly,Ri,Rm*	*285*	*S.L.*	*125*	*1,000*	*18.0*	.....	*168*	*S.L.*	*160*	*6,200*	*58*	*688*	*14,000*	*16.25*	*14.04*	*2,552*	*4,001*	*34′9″*	*27′6″*	*8′8″*	*246.0*	*16.39*	*5.47*	*9.39*	*17.1*	*20.98*	*Sp*	*Sp*
3,500	*CBL*	5	*Ja,Ri,Rm*	*300*	*3,700*	*125*	[41] *000*	*17.4*	.....	*180*	*S.L.*	*174*	*8,500*	*60*	*8,25*	*16,800*	*17.06*	*14.0*	*2,563*	*4,200*	*34′9″*	*27′10″*	*8′8″*	*246.0*	.....	.....	.....	.....	.....	*Sp*	*Sp*
7,800	CBL	5	Pwj,Ri,Rm	400	5,000	125	[55] 840	22.7	.....	200	S.L.	195	9,600	60	1,550	23,500	17.06	10.5	2,734	4,200	34′9″	27′8″	8′8″	246.0	16.39	5.47	9.39	17.1	20.98	Sp	Sp
7,200	*CBL*	5	*Wr,Ri,Rm*	*420*	*1,400*	*125*	[55] *830*	*25.6*	.....	*204*	*S.L.*	*200*	*9,600*	*60*	*1,600*	*24,000*	*17.06*	*10.0*	*2,761*	*4,200*	*34′9″*	*27′8″*	*8′8″*	*246.0*	*16.39*	*5.47*	*9.39*	*17.1*	*20.98*	*Sp*	*Sp*
7,110	CBL	5	Ja,Ri	225	S.L.	70	[55] 518	15.5	.....	144	S.L.	135	6-10,000	52	750	12,500	13.32	14.44	1,945	3,250	33′3″	25′4″	8′4″	244.0	.....	.....	.....	.....	.....	Sp	Sp
7,890	CBL	5	Ja,Ri	285	S.L.	70	[55] 504	17.0	.....	152	S.L.	144	6-10,000	52	850	14,000	13.32	11.40	1,981	3,250	33′3″	25′4″	8′4″	244.0	.....	.....	.....	.....	.....	Sp	Sp
7,070	CBL	5	Con,Ri	240	S.L.	70	[55] 492	16.5	.....	145	S.L.	136	6-10,000	52	800	13,000	13.32	13.54	1,960	3,250	33′3″	25′4″	8′4	244.0	.....	.....	.....	.....	.....	Sp	Sp
2,800	CBL	5	Ja,Ri	300	3,700	95	[55] 625	17.4	.....	161	S.L.	151	8,500	56	950	14,200	15.45	12.67	2,564	3,800	34′9″	27′7″	8′6″	246.0	.....	.....	.....	.....	.....	Sp	Sp
.....	OLB	5	Wr,Ww	285	S.L.	62	.....	.....	108	125	S.L.	95	S.L.	40	800	18,000	10.0	15.4	2,010	3,400	45′	26½′	10′5″	350.0	26.0	3.5	10.7	19.5	17.1	Sp	Sp

Price at factory, $	Type	Number of seats	Make of engine	Power Plant: Total rated h.p.	At altitude, ft.	Fuel capacity (gal.)	Normal range (mi.)	Fuel consumption at cruising speed (gal. per hr.)	Propeller diameter—(in.)	Performance: High speed (m.p.h.)	At altitude, ft.	Cruising speed (m.p.h.)	At altitude, ft.	Stalling speed (m.p.h.)	Climb at sea level (ft. per m.)	Service ceiling (ft.)	Weights: Wing loading (lb. per sq. ft.)	Power loading (lb. per h.p.)	Weight empty	Gross weight (lb.)	Dimensions: Span	Length overall	Height overall	Area—(Sq. Ft.): Wing (including ailerons)	Ailerons (total)	Fin	Rudder	Stabilizer	Elevators (total)	Wing: Spars	Ribs
.....	CML	6	3-K	300	S.L.	85	450	18.0	78	140	1,000	125	1,000	47	1,100	18,000	14.3	15.0	2,752	4,500	48′10″	33′6″	9′6″	315.0	32.0	5.5	12.0	29.0	19.0	Sp,Box	W
.....	*CML*	8	*2Wr,Ww*	*640*	*S.L.*	*140*	*720*	*35.0*	*100*	*195*	*S.L.*	*180*	*S.L.*	*55*	*1,400*	*22,000*	*18.05*	*16.16*	*3,730*	*6,500*	*50′*	*35′4″*	*10′4″*	*360.0*	*30.5*	*10.9*	*13.+*	*35.7*	*22.6*	*Ro,Sp*	*W*
.....	CML[8]	6–8	2Wr,Ww	640	S.L.	[6] 160	[1] 200	35.0	99	210	S.L.	200	10,000	59	1,200	20,000	20.7	10.3	4,670	7,500	47′8″	34′3″	9′5″	347.0	23.9	16.3	17.3	38.2	27.2	ST,Wl	D
.....	CML[8]	8–9	2Pwj	900	S.L.	[7] 210	[1] 100	43.0	99	230	S.L.	220	12,000	61	1,850	27,000	21.5	8.3	5,056	7,500	47′8″	34′3″	9′5″	347.0	23.9	16.3	17.3	38.2	27.2	ST,Wl	D
.....	CQL	15	Wr,C[9]y	715	3,900	300	610	42.0	150	165	7,000	155	12,000	64	700	16,000	17.20	15.90	6,115	11,400	65′	42′9″	11′6½″	664.0	46.0	21.0	21.0	60.0	30.0	Ro,Sp	S
.....	CML	6	Pww	550	5,000	200	600	36.3	108	190	5,000	180	12,000	64	1,240	25,000	15.50	10.20	3,440	5,600	50′6″	27′11″	8′6″	359.0	40.0	16.0	12.0	39.0	23.40	Ro,Sp	S,P
.....	CML	8	Wr,W	450	3,000	200	860	25.2	108	160	S.L.	145	3,000	64	700	12,000	15.50	13.0	3,000	5,600	50′6″	27′11″	8′6″	359.0	40.0	16.0	12.0	39.0	23.4	Ro,Sp	S,P
.....	CMF	89	4Wr,Cyy[28]	6,000	S.L.	4,200	3,100	.....	168	190	.....	175	10,000	70	650	14,000	29.3	17.5	48,545	84,000	152′	106′	22′7″	2867.0	.....	.....	.....	.....	.....	D,S	D
.....	CML	38	4Wr,Cy	4,400	S.L.	1,700	1,675	158.0	138	250	16,200	222	19,000	70	1,200	24,400	30.2	12.5	30,000	45,000	107′3″	74′4″	20′9½″	1486.0	.....	.....	.....	.....	.....	.....	.....
.....	*CML*	*14*	*2Pwh*	*1,500*	*7,000*	*300*	*600*	*108.0*	.....	*225*	*6,000*	*185*	*6,000*	*63*	*1,250*	*22,000*	*20.4*	*9.65*	*8,000*	*14,000*	*71′*	*44′*	*10′*	*686.0*	*55.0*	*26.0*	*44.0*	*62.0*	*47.5*	*Ru,D*	*D*
.....	*CML*	*34*	*3Wr*	*2,700*	*6,000*	*870*	*1,440*	*207.0*	*138*	*247*	*6,000*	*206*	*6,000*	*65*	*1,092*	*22,000*	*23.4*	*12.4*	*19,360*	*33,500*	*95′7″*	*67′*	*13′10″*	*1432.0*	*120.5*	*61.5*	*84.0*	*197.5*	*106.0*	*Ru,D*	*D*
.....	*CMA*	*17*[20]	*2Pwww*	*2,100*	*7,500*	.....	[21] *1600*	.....	.....	*196*	*7,500*	*182*	*10,000*	*69*	.....	*18,500*	*21.8*	*12.7*	.....	*30,500*	*104′*	*65′2″*	*19′9″*	*1400.0*	[18] *100.0*	*60.8*	*50.0*	*119.8*	*85.0*	*D,Ru*	*D*
.....	*CMF*	*17*[24]	*2Pwww*	*2,100*	*7,500*	.....	[22] *2200*	.....	.....	*198*	*7,500*	*185*	*10,000*	*68*	.....	*18,500*	*21.8*	*12.7*	.....	*30,500*	*104′*	*65′2″*	*19′9″*	*1400.0*	[18] *100.0*	*60.8*	*50.0*	*119.8*	*85.0*	*D,Ru*	*D*
.....	*CMF*	[10] *30*	*4Pwww*	*4,200*	*7,500*	.....	[23] *3700*	.....	.....	*226*	*7,500*	*209*	*10,000*	*76*	.....	*18,000*	*36.5*	*13.5*	.....	*65,000*	*115′*	*79′3″*	*25′4″*	*1780.0*	[16]	.....	.....	.....	.....	.....	.....
.....	*CMF*	...	*2Wr*	Perfo	rmanc	e and	techn	ical inf	ormation n	ot relea	sed..	.....	.....	.....	.....	.....	.....	.....	.....	*50,000*	*110′*	*72′7″*	*24′11″*	.....	.....	.....	.....	.....	.....	.....	.....
.....	CML	[17] 21	4P&W	Perfo	rmanc	e and	techn	ical inf	ormation n	ot relea	sed..	.....	.....	.....	.....	.....	.....	.....	.....	47,000	110′	66′0″	17′11″	.....	.....	.....	.....	.....	.....	.....	.....
.....	*CML*	*36*	*2Wr,Cy*	*1,500*	*7,000*	*1,000*	*1,570*	*140.0*	*180*	*262*	*13,000*	*222*	*10,000*	*72*	*1,500*	*26,900*	*29.4*	*11.8*	*25,700*	*40,000*	*108′*	*76′4″*	*22′*	*1360.0*	*79.2*	*115.4*	*52.8*	*158.5*	*95.0*	*D,AD*	*D, AD*
.....	*CML*	[19]	*2Wr,Cy Double Row*	*1,500*	*7,000*	*1,000*	*1,570*	*140.0*	*180*	*262*	*13,000*	*222*	*10,000*	*72*	*1,500*	*26,900*	*29.4*	*11.8*	*23,545*	[20] *40,000*	*108′*	*76′4″*	*22′*	*1360.0*	*79.2*	*115.4*	*52.8*	*158.5*	*95.0*	*D,AD*	*D, AD*
.....	CML	21	2Wr,Cy	2,000	6,900	822	2,125	104	138	220	7,900	194	11,200	67	1,070	21,900	25.5	10.5	16,600	25,200	95′	64′6″	16′11″	987.0	102.8	47.1	46.3	128.0	82.3	AD	AD
.....	CML	21	2Pwww	2,100	7,500	822	2,125	107	138	230	8,500	207	15,000	67	1,130	23,200	25.5	10.5	16,865	25,200	95′	64′6″	16′11″	987.0	102.8	47.1	46.3	128.0	82.3	AD	AD
.....	*CML*	40–42	*4Pw*	*4,400*	*6,200*	*1,700*	*2,540*	*221*	*156*	*265*	*16,900*	*242*	*15,700*	*78*	*1,350*	*26,600*	*35.6*	*10.0*	*34,425*	*52,000*	*117′6″*	*93′10″*	*27′9″*	*1462.0*	*120.4*	*72.5*	*63.4*	*210.0*	*118.6*	*AD*	*AD*
.....	CMA	8	Pwj,Ri	800	5,000	220	1,000	51.0	102	201	5,000	190	9,600	62	1,300	22,000	21.3	8.9	5,475	8,000	49′	38′4″	12′	375.0	22.5	26.7	21.0	44.8	31.2	D,Box	D
.....	CLM	17	2Pwww	2,100	7,500	644	1,540	95	126	263	8,800	239	15,000	70	1,850	23,500	33.50	8.80	12,208	18,500	65′6″	49′9 3/4″	11′10 1/2″	551.0	35.0	29.3	34.8	93.6	40.4	AD,Ru	AD
.....	CLM	17	2Pwww	2,100	15,400	644	1,540	95	126	276	16,700	248	19,000	70	1,850	27,000	33.50	8.80	12,283	18,500	65′6″	49′9 3/4″	11′10 1/2″	551.0	35.0	29.3	34.8	93.6	40.4	AD,Ru	AD
.....	CLM	17	2Wr,Cy	1,800	6,700	644	1,685	96.0	126	250	7,900	229	12,000	70	1,480	21,800	33.50	10.30	11,626	18,500	65′6″	49′9 3/4″	11′10 1/2″	551.0	35.0	29.3	34.8	93.6	40.4	AD,Ru	AD
.....	*CLM*	*17*	*2Wr,Cy*	*2,000*	*6,900*	*644*	*1,670*	*93.0*	*126*	*259*	*8,200*	*239*	*15,000*	*70*	*1,730*	*23,500*	*33.50*	*9.25*	*11,828*	*18,500*	*65′6″*	*49′9 3/4″*	*11′10 1/2″*	*551.0*	*35.0*	*29.3*	*34.8*	*93.6*	*40.4*	*AD,Ru*	*AD*
.....	*CLM*	*17*	*2Wr,Cy*	*2,000*	*14,000*	*644*	*1,670*	*93.0*	*126*	*271*	*15,300*	*248*	*19,000*	*70*	*1,730*	*26,000*	*33.50*	*9.25*	*11,838*	*18,500*	*65′6″*	*49′9 3/4″*	*11′10 1/2″*	*551.0*	*35.0*	*29.3*	*34.8*	*93.6*	*40.4*	*AD,Ru*	*AD*
.....	*CLM*	*40*	*2Pwww*	*4,200*	*15,400*	*1,200*	[24] *1612*	*191.0*	*133*	*294*	*16,700*	*258*	*19,000*	*82*	*1,465*	*24,300*	*43.00*	*8.95*	*27,524*	*43,000*	*95′0″*	*74′11 1/2″*	*18′4 1/4″*	*1000.0*	*66.2*	*94.6*	*55.6*	*239.7*	*48.4*	*AD,Rv*	*AD*
.....	*CLM*	*40*	*4Wr,Cy*	*4,400*	*15,300*	*1,200*	[24] *1716*	*216.0*	*133*	*294*	*16,600*	*258*	*12,000*	*82*	*1,695*	*24,300*	*43.00*	*8.27*	*26,960*	*43,000*	*95′0″*	*74′11 1/2″*	*18′4 1/4″*	*1000.0*	*66.2*	*94.6*	*55.6*	.....	.....	*AD,Rv*	*AD*
.....	CML	12	2Pwj[28]	800	5,000	194	810	52.0	108	202	5,000	190	9,600	64	1,000	21,150	22.9	13.15	6,450	10,500	55′	38′7″	10′1″	458.3	29.5	17.7	19.5	69.5	35.0	AD,Rv	AD
.....	CML	12	2Pww[28]	900	10,500	250	830	71.0	108	212	10,500	202	9,600	65	1,160	25,700	22.91	11.66	7,100	10,500	55′	38′7″	10′1″	458.3	29.5	17.7	19.5	69.5	35.0	AD,Rv	AD
.....	CML	8	2Pwj[28]	800	5,000	200	950	52.0	108	225	5,000	212	9,600	65	1,360	22,300	23.8	10.82	5,960	8,650	49′6″	36′4″	9′11″	352.0	22.1	13.6	17.3	54.4	33.8	AD,Rv	AD
.....	CMF	53	4Wr,Cy[28]	3,400	5,800	3,800	2,410	.....	144	182	5,800	140	10,000	67	.....	.....	27.4	18.2	31,292	63,000	157′	91′10″	27′2¾″[29]	2300.0	113.3	148.6	72.4	233.4	124.8	D	D
.....	CMF	37	4Pwh[28]	3,000	7,000	1,240	1,200	168.0	138	188	7,000	163	7,000	65	800	15,000	31.3	14.0	24,000	42,000	118′2″	68′	21′5″	1340.0	103.7	64.0	62.0	146.0	79.4	D,Trs	D
.....	CMA	18	2Pwh[28]	1,500	7,000	400	775	84.0	138	190	7,000	166	7,000	65	1,000	19,000	25.0	13.0	12,900	19,500	86′	51′2″	17′8″	780.6	53.2	35.4	30.6	86.4	41.7	D,Box	D
.....	CMA	18	2Pwh[28]	1,500	7,000	400	775	84.0	138	190	7,000	166	7,000	65	1,000	19,000	25.64	13.33	13,100	20,000	86′	52′3″	17′8″	780.6	53.2	26.8	30.74	86.4	58.47	D,Box	D
.....	*CMF*	*32*	*4Pwh*	*4,200*	*7,500*	*3,900*	*3,800*	.....	*150*	.....	.....	*175*	*7,500*	*65*	*600*	*17,000*	*34.4*	*13.7*	*30,200*	*57,500*	*127′*	*79′3″*	*27′7¼″*	*1670.0*	.....	.....	.....	.....	.....	*D,Trs*	*D*

es

Goodrich
Autogiro
Hayes
Hydraulic
"I" section
Inverted
Jacobs
Pinner
Ken Royce
Landplane
Lambert
LeBlond
Lenape
Laminated
Low Pressure
Lycoming

M — Monoplane
Me — Metal
Mech — Mechanical
Men — Menasco
Mil — Military
Mo — Monocoque
Mu — Multicellular
O — Open
Ol — Oleo
Op — Optional
Pal — Palmer
Ply — Plywood
Pn — Pneumatic
Pob — Pobjoy
Pwh — P & W Hornet
Pwj — P & W Wasp, Jr.
Pwwj — P & W Twin Wasp, Jr.
Pww — P & W Wasp
Pwww — P & W Twin Wasp
Q — Sesquiplane
Ran — Ranger
Re — Retractable
Ri — Lord Instrument Mounting
Rm — Lord Engine Mounting
RW — Retractable Wheel
Ro — Routed
Ru — Rusco
Rv — Riveted
S — Steel
Sc — Shock cord
Se — Security
Sk — Skid
Sl — Streamline
S.L. — Sea Level
Sh — Shinn
S.M.B. — Single metal box
Sol — Solid
Sp — Spruce
Spr — Spring
SS — Stainless Steel
Stu — Studebaker,
Sa — Ssekly
T — Tubing
Trs — Truss
Ty — Tricycle
W — Wood
War — Warner
Wel — Welch
Wh — Wheel
Wl — Welded
Wr — Wright
Ww — Whirlwind

Civil Aircraft Footnotes. These refer to tables on pages 105 and 106 also.

[1] Plastic type.
[2] First minute.
[3] Available as seaplane or skiplane.
[4] Also available with 170 gal. capacity.
[5] Also available with 121 gal. capacity.
[6] Also available with 210 gal. capacity.
[7] Also available with 260 gal. capacity.
[8] All range figures with 45 minute reserve fuel.
[9] Brake Richland-Wendt mechanical shock strut Goodrich-Wendt rubber spring. (compression).
[10] Tail unit 360° swivelling Servite-tired service caster Buffalo spring.
[11] Tricycle.
[12] Retractable, steerable nose wheel.
[13] At most economical speed.
[14] Plastic bonded wood veneer.
[15] Plastic (Polyvinyl acetate bonded) pressure molded; entire body structure of HM-5, including tail surfaces, are molded.
[16] Aileron area aft of hinge line.
[17] Passenger seats only.
[18] Night arrangement.
[19] Seating arrangements optional.
[20] Maximum gross weight 45,000 lb.
[21] Minimum speed, power on, level flight. Restricted control, stall not possible.
[22] Mahogany and spruce truss and mahogany web.
[23] Has been approved by West Coast Office, C.A.A.
[24] Range at 200 mph.at 12,000 feet.
[25] Flaps.
[26] Patented "x" braced wing.
[27] Geared engine.
[28] Rm, Ri.
[29] On beachi
[30] At 60% fu
[31] At 60% po
[32] Disc Loadi
[33] Rotor diam
[34] Rotor disc
[35] Trim flaps
[36] Step taper
[37] Steerable
[38] High press
[39] Structure
[40] Franklin 8
electric starter
[41] Steerable
[42] Ship is
center section
balanced ailer
[43] Cantilever

Aviation's Civil Aircraft Specifi

AVIATION does not assume responsibility for the figures g

				Power Plant						Performance							Weights				Dimensions		
Price at factory, $	Type	Number of seats	Make of engine	Total rated h.p.	At altitude, ft.	Fuel capacity (gal.)	Normal range (mi.)	Fuel consumption at cruising speed (gal. per hr.)	Propeller diameter—(in.)	High speed (m.p.h.)	At altitude, ft.	Cruising speed (m.p.h.)	At altitude, ft.	Stalling speed (m.p.h.)	Climb at sea level (ft. per m.)	Service ceiling (ft.)	Wing loading (lb. per sq. ft.)	Power loading (lb. per h.p.)	Weight empty	Gross weight (lb.)	Span	Length overall	
.....	CBL[2]	5	Wr,Ww	450	S.L.	[4]101	[8]670	23.0	99	211	S.L.	202	9,700	50	1,400	23,000	14.17	10.0	2,622	4,250	32'0"	26'10¹¹⁄₁₆"	8'
.....	CBL[3]	5	Wr,Ww	320	S.L.	[4]98	[8]820	17.0	99	178	S.L.	170	9,600	50	1,100	15,500	14.17	13.1	2,517	4,250	32'	26'7¼"	8'
.....	CBL[3]	5	Pwj	450	S.L.	[4]101	[8]670	23.0	99	211	S.L.	202	9,700	50	1,500	25,000	14.17	10.5	2,605	4,250	32'	25'11⅛"	8'
.....	CBL[3]	5	Ja	285	S.L.	[4]75	[8]600	17.0	93	185	S.L.	177	7,200	45	1,200	18,000	11.3	11.7	2,165	3,390	32'	25'11¼"	8'
.....	CBL[3]	5	Ja	330	3,700	[4]75	[8]600	17.0	99	190	S.L.	182	10,000	46	1,300	18,000	11.9	10.7	2,255	3,590	32'	25'11¼"	8'
.....	CML[49]	4	War,Ri	145	S.L.	[50]35	525	9.5	84	162	S.L.	151	8,200	49	1,000	18,000	13.5	16.9	1,380	2,450	34'2"	24'8"	7'
.....	CML[49]	4	War,Ri	165	S.L.	[50]35	485	10.8	86[24]	165	S.L.	157	8,200	49	1,125	19,300	13.5	14.8	1,400	2,450	34'2"	25'0"	7'
.....	CML[49]	5	2Ja,Ri	450	S.L.	[51]120	750	28.0	93	195	S.L.	191	7,500	55	1,525	22,000	17.3	11.3	3,600	5,100	41'11"	32'9"	9'
.....	*A* *	4	*Ran*	*200*	*S.L.*	*55*	*500*	.....	*96*	*140*	*S.L.*	*125*	*S.L.*	*50*	*800*	*14,500*	*14.5*	*14.3*	*1,730*	*2,860*	*40'*	*30'10"*	8'
.....	CML*	4	War[28]	145	S.L.	60	720	9.5	86	135	S.L.	122	7,000	50	720	15,700	13.2	17.58	1,482	2,550	36'4"	23'9"	8'
.....	*CMA*	4	*Ja*[28]	*285*	*S.L.*	*70*	*560*	*18.0*	*102*	*160*	*S.L.*	*144*	*S.L.*	*61*	*950*	*15,000*	*14.7*	*12.1*	*2,320*	*3,450*	*40'6"*	*32'0"*	*12*
.....	J	...	Ja	300	S.L.	70	516	18.0	102	150	S.L.	135	.....	58	914	14,000	15.96	12.5	2,453.7	3,750	40'6"	32'0"	12
.....		...	Ja	300	S.L.	70	516	18.0	102	150	S.L.	139	6,000	59	1,078	14,300	16.0	12.67	2,509.7	3,850	40'6"	32'0"	12
.....	*CMA*	5	*2Ran*	*400*	*S.L.*	*108*	*775*	*20.0*	*82*	.....	.....	*150*	*3,000*	*61*	*870*	*15,000*	*18.375*	*11.25*	*3,075*	*4,500*	*40'*	*31'*	*9'*
.....	CLM	4	War	145	S.L.	34	480	9.0	84	140	S.L.	135	Max.	52	650	12,000	14.05	17.94	1,750	2,600	35'9¾"	23'4"	7'
n req.	*CML*	5	*Pwj,Rm,Ri*	*400*	*5,000*	*121*	*920*	*24.0*	*99*	*186*	*S.L.*	*192*	*9,600*	*60*	*1,560*	*21,500*	*20.7*	*10.9*	*2,725*	*4,350*	*38'0"*	*26'1¾"*	*8'*
n req.	*CML*	5	*Ja,Rm,Ri*	*300*	*3,700*	*118*	*1,100*	*18.5*	*99*	*178*	*S.L.*	*169*	*6,000*	*60*	*1,000*	*15,500*	*20.7*	*14.5*	*2,500*	*4,350*	*38'0"*	*26'*	*8'*
n req.	CML	5	Wr,Rm,Ri	320	.....	118	1,025	18.5	99	.....	.....	175	8,500	60	1,050	17,500	20.7	13.6	2,500	4,350	38'0"	26'2¼"	8'
.....	*CML*	4–5	*2Lam*	*180*	*S.L.*	*70*	*862*	*10.0*	*78*	*150*	*S.L.*	*135*	*8,600*	*48*	*560*	*10,800*	*13.9*	*17.9*	*1,882*	*3,220*	*36'*	*24'6"*	*7'*
6,485	*CML*	4	*War*	*145*	*S.L.*	*40*	*580*	*9.5*	*90*	*156*	*S.L.*	*135*	*S.L.*	*50*	*900*	*17,000*	*14.3*	*16.4*	*1,395*	*2,375*	*33'6"*	*26'1"*	*7'*
.....	*CML*	4	*Men*	*150*	*3,000*	*40*	*572*	*10.0*	*84*	*159*	*3,000*	*139*	*3,000*	*50*	*1,000*	*19,000*	*14.3*	*15.8*	*1,325*	*2,375*	*33'6"*	*26'11"*	*7'*
.....	*CML*	4	*War*	*165*	*S.L.*	*40*	*590*	*10.0*	*90*	*164*	*S.L.*	*141*	*S.L.*	*50*	*1,000*	*18,000*	*14.3*	*14.4*	*1,410*	*2,375*	*33'6"*	*26'1"*	*7'*
.....	*CML*	4–5	*Ly,Rm*	*285*	*S.L.*	*100*	*835*	*18.8*	*102*	.....	.....	*155*	*4,000*	*60*	*1,040*	*15,800*	*16.0*	*14.6*	*2,650*	*4,150*	*41'10½"*	*27'10½"*	*8'*
.....	CML*	4–5	Wr,Ww,Rm	420	1,400	100	610	27.0	102	.....	.....	172.5	5,500	62	1,450	19,400	18.0	11.1	3,045	4,650	41'10½"	28'3"	8'
.....	*CBL*	5	*Ly,Ri,Rm*	*285*	*S.L.*	*125*	*1,000*	*18.0*	.....	*168*	*S.L.*	*160*	*6,200*	*58*	*688*	*14,000*	*16.25*	*14.04*	*2,552*	*4,001*	*34'9"*	*27'6"*	*8'*
3,500	*CBL*	5	*Ja,Ri,Rm*	*300*	*3,700*	*125*	[55]*1,000*	*17.4*	.....	*180*	*S.L.*	*174*	*8,500*	*60*	*8,25*	*16,800*	*17'06*	*14.0*	*2,563*	*4,200*	*34'9"*	*27'10"*	*8'*
7,800	CBL	5	Pwj,Ri,Rm	400	5,000	125	[55]840	22.7	.....	200	S.L.	195	9,600	60	1,550	23,500	17.06	10.5	2,734	4,200	34'9"	27'8"	8'
7,200	*CBL*	5	*Wr,Ri,Rm*	*420*	*1,400*	*125*	[55]*830*	*25.6*	.....	*204*	*S.L.*	*200*	*9,600*	*60*	*1,600*	*24,000*	*17.06*	*10.0*	*2,761*	*4,200*	*34'9"*	*27'8"*	*8'*
7,110	CBL	5	Ja,Ri	225	S.L.	70	[55]518	15.5	.....	144	S.L.	135	6-10,000	52	750	12,500	13.32	14.44	1,945	3,250	33'3"	25'4"	8'
7,890	CBL	5	Ja,Ri	285	S.L.	70	[55]504	17.0	.....	152	S.L.	144	6-10,000	52	850	14,000	13.32	11.40	1,981	3,250	33'3"	25'4"	8'
7,070	CBL	5	Con,Ri	240	S.L.	70	[55]492	16.5	.....	145	S.L.	136	6-10,000	52	800	13,000	13.32	13.54	1,960	3,250	33'3"	25'4"	8'
2,800	CBL	5	Ja,Ri	300	3,700	95	[55]625	17.4	.....	161	S.L.	151	8,500	56	950	14,200	15.45	12.67	2,564	3,800	34'9"	27'7"	8'
.....	OLB	5	Wr,Ww	285	S.L.	62	.....	.....	108	125	S.L.	95	S.L.	40	800	18,000	10.0	15.4	2,010	3,400	45'	26½"	10
.....	CML	6	3-K	300	S.L.	85	450	18.0	78	140	1,000	125	1,000	47	1,100	18,000	14.3	15.0	2,752	4,500	48'10"	33'6"	9'
.....	*CML*	8	*2Wr,Ww*	*640*	*S.L.*	*140*	*720*	*35.0*	*100*	*195*	*S.L.*	*180*	*S.L.*	*55*	*1,400*	*22,000*	*18.05*	*16.16*	*3,730*	*6,500*	*50'*	*35'4"*	*10*
.....	CML[3]	6–8	2Wr,Ww	640	S.L.	[8]160	[81,200	35.0	99	210	S.L.	200	10,000	59	1,200	20,000	20.7	10.3	4,670	7,500	47'8"	34'3"	9'
.....	CML[3]	8–9	2Pwj	900	S.L.	[7]210	[81,100	43.0	99	230	S.L.	220	12,000	61	1,850	27,000	21.5	8.3	5,056	7,500	47'8"	34'3"	9'
.....	CQL	15	Wr,Cy	715	3,900	300	610	42.0	150	165	7,000	155	12,000	64	700	16,000	17.20	15.90	6,115	11,400	65'	42'9"	11
.....	CML	6	Pww	550	5,000	200	600	36.3	108	190	5,000	180	12,000	64	1,240	25,000	15.50	10.20	3,440	5,600	50'6"	27'11"	8'
.....	CML	8	Wr,W	450	3,000	200	860	25.2	108	160	S.L.	145	3,000	64	700	12,000	15.50	13.0	3,000	5,600	50'6"	27'11"	8'
.....	CMF	89	4Wr,Cyy[28]	6,000	S.L.	4,200	3,100	.....	168	190	.....	175	10,000	70	650	14,000	29.3	17.5	48,545	84,000	152'	106'	27
.....	CML	38	4Wr,Cy	4,400	S.L.	1,700	1,675	158.0	138	250	16,200	222	19,000	70	1,200	24,400	30.2	12.5	30,000	45,000	107'3"	74'4"	20
.....	*CML*	*14*	*2Pwh*	*1,500*	*7,000*	*300*	*600*	*108.0*	.....	*225*	*6,000*	*185*	*6,000*	*63*	*1,250*	*22,000*	*20.4*	*9.65*	*8,000*	*14,000*	*71'*	*44'*	*10*
.....	*CML*	*34*	*3Wr*	*2,700*	*6,000*	*870*	*1,440*	*207.0*	*138*	*247*	*6,000*	*206*	*6,000*	*65*	*1,092*	*22,000*	*23.4*	*12.4*	*19,360*	*33,500*	*95'7"*	*67'*	*13*
.....	*CMA*	*17*[20]	*2Pwww*	*2,100*	*7,500*	.....	[13]*1600*	.....	.....	*196*	*7,500*	*182*	*10,000*	*69*	.....	*18,500*	*21.8*	*12.7*	.....	*30,500*	*104'*	*65'2"*	*19*
.....	*CMF*	*17*[24]	*2Pwww*	*2,100*	*7,500*	.....	[13]*2200*	.....	.....	*198*	*7,500*	*185*	*10,000*	*68*	.....	*18,500*	*21.8*	*12.7*	.....	*30,500*	*104'*	*65'2"*	*19*
.....	*CMF*	[18]30	*4Pwww*	*4,200*	*7,500*	.....	[13]*3700*	.....	.....	*226*	*7,500*	*209*	*10,000*	*76*	.....	*18,000*	*36.5*	*13.5*	.....	*65,000*	*115'*	*79'3"*	*25*
.....	*CMF*	...	*2Wr*	Perfo	rmance	e and	techn	ical inf	ormat	ion n	ot relea	sed...	.....	.....	.....	.....	.....	.....	.....	*50,000*	*110'*	*72'7"*	*24*
.....	CML	[17]21	4P&W	Perfo	rmance	e and	techn	ical inf	ormat	ion n	ot relea	sed...	.....	.....	.....	.....	.....	.....	.....	47,000	110'	66'0"	17
.....	*CML*	*36*	*2Wr,Cy*	*1,500*	*7,000*	*1,000*	*1,570*	*140.0*	*180*	*262*	*13,000*	*222*	*10,000*	*72*	*1,500*	*26,900*	*29.4*	*11.8*	*25,700*	*40,000*	*108'*	*76'4"*	*22*
			Double Row																				
.....	*CML*	*19*	*2Wr,Cy*	*1,500*	*7,000*	*1,000*	*1,570*	*140.0*	*180*	*262*	*13,000*	*222*	*10,000*	*72*	*1,500*	*26,900*	*29.4*	*11.8*	*23,545*	[20]*40,000*	*108'*	*76'4"*	*22*
			Double Row																				
.....	CML	21	2Wr,Cy	2,000	6,900	822	2,125	104	138	220	7,900	194	11,200	67	1,070	21,900	25.5	10.5	16,600	25,200	95'	64'6"	16'
.....	CML	21	2Pwww	2,100	7,500	822	2,125	107	138	230	8,500	207	15,000	67	1,130	23,200	25.5	10.5	16,865	25,200	95'	64'6"	16'
.....	*CML*	40–42	*4Pw*	*4,400*	*6,200*	*1,700*	*2,540*	*221*	*156*	*265*	*16,900*	*242*	*15,700*	*78*	*1,350*	*26,600*	*35.6*	*10.0*	*34,425*	*52,000*	*117'6"*	*93'10"*	*27*
.....	CMA	8	Pwj,Ri	800	5,000	220	1,000	51.0	102	201	5,000	190	9,600	62	1,300	22,000	21.3	8.9	5,475	8,000	49'	38'4"	12'
.....	CLM	17	2Pwww	2,100	7,500	644	1,540	95	126	263	8,800	239	15,000	70	1,850	23,500	33.50	8.80	12,208	18,500	65'6"	49'9⅞"	11'
.....	CLM	17	2Pwww	2,100	15,400	644	1,540	95	126	276	16,700	248	19,000	70	1,850	27,000	33.50	8.80	12,283	18,500	65'6"	49'9⅞"	11'
.....	CLM	17	2Wr,Cy	1,800	6,700	644	1,685	96.0	126	250	7,900	229	12,000	70	1,480	21,800	33.50	10.30	11,626	18,500	65'6"	49'9⅞"	11'
.....	*CLM*	*17*	*2Wr,Cy*	*2,000*	*6,900*	*644*	*1,670*	*93.0*	*126*	*259*	*8,200*	*239*	*15,000*	*70*	*1,730*	*23,500*	*33.50*	*9.25*	*11,828*	*18,500*	*65'6"*	*49'9⅞"*	*11'*
.....	*CLM*	*17*	*2Wr,Cy*	*2,000*	*14,000*	*644*	*1,670*	*93.0*	*126*	*271*	*15,300*	*248*	*19,000*	*70*	*1,730*	*26,000*	*33.50*	*9.25*	*11,838*	*18,500*	*65'6"*	*49'9⅞"*	*11'*
.....	*CLM*	*40*	*2Pwww*	*4,200*	*15,400*	*1,200*	[24]*1612*	*191.0*	*133*	*294*	*16,700*	*258*	*19,000*	*82*	*1,465*	*24,300*	*43.00*	*8.95*	*27,524*	*43,000*	*95'0"*	*74'11½"*	*18*
.....	*CLM*	*40*	*4Wr,Cy*	*4,400*	*15,300*	*1,200*	[24]*1716*	*216.0*	*133*	*294*	*16,600*	*258*	*12,000*	*82*	*1,695*	*24,300*	*43.00*	*8.27*	*26,960*	*43,000*	*95'0"*	*74'11½"*	*18*
.....	CML	12	2Pwj[25]	800	5,000	194	810	52.0	108	202	5,000	190	9,600	64	1,000	21,150	22.9	13.15	6,450	10,500	55'	38'7"	10'
.....	CML	12	2Pww[28]	900	10,500	250	830	71.0	108	212	10,500	202	9,600	65	1,160	25,700	22.91	11.66	7,100	10,500	55'	38'7"	10'
.....	CML	8	2Pwj[28]	800	5,000	200	950	52.0	108	225	5,000	212	9,600	65	1,360	22,300	23.8	10.82	5,960	8,650	49'6"	36'4"	9'1
.....	CMF	53	4Wr,Cy[28]	3,400	5,800	3,800	2,410	.....	144	182	5,800	140	10,000	67	.....	.....	27.4	18.2	31,292	63,000	157'	91'10"	27'
.....	CMF	37	4Pwh[28]	3,000	7,000	1,240	1,200	168.0	138	188	7,000	163	7,000	65	800	15,000	31.3	14.0	24,000	42,000	118'2"	68'	21'
.....	CMA	18	2Pwh[28]	1,500	7,000	400	775	84.0	138	190	7,000	166	7,000	65	1,000	19,000	25.0	13.0	12,900	19,500	86'	51'2"	17'
.....	CMA	18	2Pwh[28]	1,500	7,000	400	775	84.0	138	190	7,000	166	7,000	65	1,000	19,000	25.64	13.33	13,100	20,000	86'	52'3"	17'
.....	*CMF*	32	*4Pwh*	*4,200*	*7,500*	*3,900*	*3,800*	.....	*150*	.....	.....	*175*	*7,500*	*65*	*600*	*17,000*	*34.4*	*13.7*	*30,200*	*57,500*	*127'*	*79'3"*	*27*

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M — Monoplane
Me — Metal
Mech — Mechanical
Men — Menasco
Mil — Military
Mo — Monocoque
Mu — Multicellular
O — Open
Ol — Oleo
Op — Optional
Pal — Palmer
Ply — Plywood
Pn — Pneumatic
Pob — Pobjoy
Pwh — P & W Hornet
Pwj — P & W Wasp, Jr.
Pwwj — P & W Twin Wasp, Jr.
Pww — P & W Wasp
Pwww — P & W Twin Wasp
Q — Sesquiplane
Ran — Ranger
Re — Retractable
Ri — Lord Instrument Mounting
Rm — Lord Engine Mounting
RW — Retractable Wheel
Ro — Routed
Ru — Rusco
Rv — Riveted
S — Steel
Se — Shock cord
Se — Security
Sk — Skid
Sl — Streamline
S.L. — Sea Level
Sh — Shinn
S.M.B. — Single metal box
Sol — Solid
Sp — Spruce
Spr — Spring
SS — Stainless Steel
Stu — Studebaker,
Sz — Szekly
T — Tubing
Trs — Truss
Ty — Trecyle
W — Wood
War — Warner
Wel — Welch
Wh — Wheel
Wl — Welded
Wr — Wright
Ww — Whirlwind

Civil Aircraft Footnotes. These refer

[1] Plastic type.
[2] First minute.
[3] Available as seaplane or skiplane.
[4] Also available with 170 gal. capacity.
[5] Also available with 121 gal. capacity.
[6] Also available with 210 gal. capacity.
[7] Also available with 260 gal. capacity.
[8] All range figures with 45 minute reserve fuel.
[9] Brake Richland-Wendt mechanical shock strut Goodrich-Wendt rubber spring. (compression).
[10] Tail unit 360° swivelling Servite-tired service caster Buffalo spring.
[11] Tricycle.
[13] Retractable, steerable nose wheel.
[18] At most economical speed.
[14] Plastic bonded wood veneer.

ecifications (Cont'd)

ne figures given

Dimensions			Area — (Sq. Ft.)						Wings			Landing Gear						Fuselage or Hull †
Span	Length overall	Height overall	Wing (including ailerons)	Ailerons (total)	Fin	Rudder	Stabilizer	Elevators (total)	Spars	Ribs	Covering material	Type	Tread (in.)	Wheel type and size	Brakes (type and make)	Landing gear shock unit (type and make)	Tail unit	
32'0"	26'10½"	8'	296.5	23.75	6.56	8.7	24.5	16.6	Sp,Sol	Sp	Fab	Re	86	Go 7.50x10	Hyd	Spr,Ol	Rw	ST,Wl,Fab
32'	26'7⅛"	8'	296.5	23.75	6.56	8.7	24.5	16.6	Sp,Sol	Sp	Fab	Re	86	Go 7.50x10	Hyd	Spr,Ol	Rw	ST,Wl,Fab
32'	25'11¼"	8'	296.5	23.75	6.56	8.7	24.5	16.6	Sp,Sol	Sp	Fab	Re	86	Go 7.50x10	Hyd	Spr,Ol	Rw	ST,Wl,Fab
32'	25'11¼"	8'	296.5	23.75	5.54	8.7	23.7	15.1	Sp,Sol	Sp	Fab	Re	86	Go 7.50x10	Hyd	Spr,Ol	Rw	ST,Wl,Fab
32'	25'11½"	8'	296.5	23.75	5.54	8.7	23.7	15.1	Sp,Sol	Sp	Fab	Re	86	Go 7.50x10	Hyd	Spr,Ol	Rw	ST,Wl,Fab
34'2"	24'8"	7'0"	181.0	12.35	7.1	6.11	17.3	13.0	Lmd,Sp	Sp	Fab,D	Fx	87	6.50x10	Go,Hyd	OlCessna	Wh	ST,Wl,Fab
34'2"	25'0"	7'0"	181.0	12.35	7.1	6.11	17.3	13.0	Lmd,Sp	Sp	Fab,D	Fx	87	6.50x10	Go,Hyd	OlCessna	Wh	ST,Wl,Fab
41'11"	32'9"	9'11"	295.0	18.0	10.9	14.9	40.0	22.7	Lmd,Sp	Sp	Fab,D	Re	151	8.50x10	Go,Hyd	Ol,Bx	Wh	ST,Wl,Fab
40'	*30'10"*	*8'9"*	*197.5*	*16.08*	*14.41*	*9.98*	*18.58*	*10.30*	*Box type 30% chord*	*Full web*	*Plastic bonded mat'g.*	*Re*	*98¼*	*Retractable 360° swivel tail*	*Hyd*	.....	*Re*	*Modified NACA Model 35-B*
36'4"	23'9"	8'	193.3	21.0	6.1	10.1	21.9	13.5	Sol,Sp	Sp	Fab	Fx	111	Ha 7.50x10	Hyd,Pal	Ol	Wh	ST,Wl,Fab
40'6"	*32'0"*	*12'6"*	*235.0*	*23.3*	*18.9*	*12.5*	*8.7*	*15.1*	*SS,Wl*	*SSWl*	*Fab*	*Re*	*93½*	*7½x10*	*GrPal*	*Bz*	*Wh*	*SS,Wl*
40'6"	32'0"	12'6"	235.0	23.3	18.9	12.5	8.7	15.1	SS,Wl	SSWl	Fab	Re	93½	7½x10	GrPal	Bx	Wh	SS,Wl
40'6"	32'0"	12'6"	235.0	23.3	18.9	12.5	8.7	15.1	SS,Wl	SSWl	Fab	Re	93½	7½x10	GrPal	Bx	Wh	SS,Wl
40'	*31'*	*9'*	*245.0*	*14.6*	*12.3*	*14.0*	*25.8*	*19.6*	*D,Box*	*D*	*Me,Fab*	*Re*	*90*	*Ha 7.50x10*	*HaHyd,*	*Bz,Ol*	*Wh*	*D,Mo*
35'9¾"	23'4"	7'3"	185.0	13.02	12.58	10.9	21.2	17.12	D	Me	D	Re	91	21"Sl Gen	Hyd	Acp,Ol	Wh	AD,Rv
38'0"	*26'1¾"*	*8'5"*	*210.0*	*18.54*	*11.72*	*9.62*	*21.27*	*21.20*	*Sol,Sp*	*Sp*	*Ply*	*Fx*	*100*	*8.50x10*	*Go,Hyd*	*Ol,Hwd*	*Wh*	*ST,Wl,D,Fab*
38'0"	26'	8'5"	210.0	18.54	11.72	9.62	21.27	21.20	Sol,Sp	Sp	Ply	Fx	100	8.50x10	Go,Hyd	Ol,Hwd	Wh	ST,Wl,D,Fab
38'0"	26'2¼"	8'5"	210.0	18.54	11.72	9.62	21.27	21.20	Sol,Sp	Sp	Ply	Fx	100	8.50x10	Go,Hyd	Ol,Hwd	Wh	ST,Wl,D,Fab
36'	24'6"	7'10"	231.0	18.5	11.68	8.37	28.32	14.76	Sp,Box	W	Fab	Re	120	Go 7.50x10	Go,Hyd	Ol	Wh	ST,Wl,Fab
33'6"	26'1"	7'5"	166.0	17.5	8.7	8.3	16.1	11.6	Sol,Sp	Sp	Fab	Fx	109	6.50x10	Det.Mich	Air-l	Wh	ST,Wl,Fab
33'6"	26'11"	7'5"	166.0	17.5	8.7	8.3	16.1	11.6	Sol,Sp	Sp	Fab	Fx	109	6.50x10	Det.Mich	Air-l	Wh	ST,Wl,Fab
33'6"	26'1"	7'5"	166.0	17.5	8.7	8.3	16.1	11.6	Sol,Sp	Sp	Fab	Fx	109	6.50x10	Det.Mich	Air-l	Wh	ST,Wl,Fab
41'10½"	27'10¼"	8'7"	258.5	22.02	12.0	15.16	25.08	19.75	ST,Wl,Trs	Ru,D	Fab	Fx	111½	Ha 7.50x10	Gr,Hyd	Spr,Ol	Wl	ST,Wl,Fab
41'10½"	28'3"	8'7"	258.5	22.02	12.0	15.16	25.08	19.75	ST,Wl,Trs	Ru,D	Fab	Fx	111½	Ha 7.50x10	Gr,Hyd	Spr,Ol	Wh	ST,Wl,Fab
34'9"	27'6"	8'8"	246.0	16.39	5.47	9.39	17.1	20.98	Sp	Sp	Ply	....	101	7.50x10	Go,Hyd	Waco,Ol	Wh	.....
34'9"	27'10"	8'8"	246.0	.....	.....	.....	.....	.....	Sp	Sp	Ply	....	101	7.50x10	Go,Hyd	Waco,Ol	Wh	.....
34'9"	27'8"	8'8"	246.0	16.39	5.47	9.39	17.1	20.98	Sp	Sp	Ply	....	101	7.50x10	Go,Hyd	Waco,Ol	Wh	.....
34'9"	27'8"	8'8"	246.0	16.39	5.47	9.39	17.1	20.98	Sp	Sp	Ply	....	101	7.50x10	Go,Hyd	Waco,Ol	Wh	.....
33'3"	25'4"	8'4"	244.0	.....	.....	.....	.....	.....	Sp	Sp	Fab	....	102	7.50x10	Ha,Hyd	Waco,Ol	Wh	.....
33'3"	25'4"	8'4"	244.0	.....	.....	.....	.....	.....	Sp	Sp	Fab	....	102	7.50x10	Ha,Hyd	Waco,Ol	Wh	.....
33'3"	25'4"	8'4"	244.0	.....	.....	.....	.....	.....	Sp	Sp	Fab	....	102	7.50x10	Ha,Hyd	Waco,Ol	Wh	.....
34'9"	27'7"	8'6"	246.0	.....	.....	.....	.....	.....	Sp	Sp	Fab	....	99	8.50x10[47]	Go,Hyd	Waco,Ol	None	.....
45'	26½"	10'5"	350.0	26.0	3.5	10.7	19.5	17.1	Sp	Sp	Fab	Fx	96	Wire 32x6	Hyd	Ol	W	D,Ru,Fab

48'10"	33'6"	9'6"	315.0	32.0	5.5	12.0	29.0	19.0	Sp,Box	W	Fab	Fx	165½	Aut 9.50x12	Aut	Ol	Wh	ST,Wl,Fab
50'	*35'4"*	*10'4"*	*360.0*	*30.5*	*10.9*	*13.4*	*35.7*	*22.6*	*Ro,Sp*	*W*	*Fab*	*Fx*	*146*	*Aut 27"*	*Aut,Hyd*	*Ol*	*Wh*	*ST,Wl,Fab*
47'8"	34'3"	9'5"	347.0	23.9	16.3	17.3	38.2	27.2	ST,Wl	D	D	Re	154¾	Go 29x13.5	Hyd,Go	Air,Oil	Rw	D
47'8"	34'3"	9'5"	347.0	23.9	16.3	17.3	38.2	27.2	ST,Wl	D	D	Re	154¾	Go 29x13.5	Hyd,Go	Air,Oil	Rw	D
65'	42'9"	11'6½"	664.0	46.0	21.0	21.0	60.0	30.0	Ro,Sp	S	Fab	Fx	216	Go AW36x16	Go	Ol	Wh	ST,Wl,Fab
50'6"	27'11"	8'6"	359.0	40.0	16.0	12.0	39.0	23.40	Ro,Sp	S,Ply	Fab	Fx	96⅝	Gen Sl,31"	Bx	Ol	Wh	ST,Wl,Fab
50'6"	27'11"	8'6"	359.0	40.0	16.0	12.0	39.0	23.4	Ro,Sp	S,Ply	Fab	Fx	96⅝	Gen Sl,31"	Bx	.....	.....	.....
152'	106'	27'7"	2867.0	.....	.....	.....	.....	.....	D,S	D	AD,Fab	.....	.....	.....	.....	.....	.....	D,Rv,AD
107'3"	74'4"	20'9½"	1486.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
71'	*44'*	*10'*	*686.0*	*55.0*	*26.0*	*44.0*	*62.0*	*47.5*	*Rs,D*	*D*	*D*	*Re*	*126*	*Aut*	*Aut*	*Aer,Ol*	*Wh*	*D,Ru,D*
95'7"	67'	13'10"	1432.0	120.5	61.5	84.0	197.5	106.0	Rs,D	D	AD	Re	206.5	Aut 55x19	Aut	Aer,Ol	Wh	D
104'	65'2"	19'9"	1400.0	[14]100.0	60.8	50.0	119.8	85.0	D,Rv	D	D,Fab	Re	199	47" Sm.Cont.	Hyd	Oleo	.....	D,Rv,Mo
104'	65'2"	19'9"	1400.0	[14]100.0	60.8	50.0	119.8	85.0	D,Rv	D	D,Fab	Re	.....	Floats	.....	.....	.....	D,Rv,Mo
115'	79'3"	25'4"	1780.0	[18]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
110'	72'7"	24'11"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
110'	66'0"	17'11"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
108'	76'4"	22'	1360.0	79.2	115.4	52.8	158.5	95.0	D,AD	D, AD	AD	Re	311	19x23	Hyd	Ol,Pn	Rw	D,Rv,AD
108'	76'4"	22'	1360.0	79.2	115.4	52.8	158.5	95.0	D,AD	D, AD	AD	Re	311	19x23	Hyd	Ol,Pn	Rw	D,Rv,AD
95'	64'6"	16'11"	987.0	102.8	47.1	46.3	128.0	82.3	AD	AD	AD	Re	222	Bx 45x17–16	Bx,Hyd	Bx,Ol,Pn	Wh	AD,Rv,AD
95'	64'6"	16'11"	987.0	102.8	47.1	46.3	128.0	82.3	AD	AD	AD	Re	222	Bx 45x17–16	Bx,Hyd	Bx,Ol,Pn	Wh	AD,Rv,AD
117'6"	93'10"	27'9"	1462.0	120.4	72.5	63.4	210.0	118.6	AD	AD	AD	Re[11]	296	Go 42x15.50–16	Go,Hyd	Bz,Ol,Pn	[12]	AD,Rv,AD
99'	38'4"	12'	375.0	22.5	26.7	21.0	44.8	31.2	D,Box	D	Me	Re	90⅜	Ha 32x6	Ha,Hyd	Bx,Ol	Wh	D,Mo
55'6"	49'9⅞"	11'10½"	551.0	35.0	29.3	34.8	93.6	40.4	AD,Ru	AD	AD	Re	184	Go 42.31x15.6	Go,Hyd	Aer	Wh	AD,Ru,Mo
55'6"	49'9⅞"	11'10½"	551.0	35.0	29.3	34.8	93.6	40.4	AD,Ru	AD	AD	Re	184	Go 42.31x15.6	Go,Hyd	Aer	Wh	AD,Ru,Mo
55'6"	49'9⅞"	11'10½"	551.0	35.0	29.3	34.8	93.6	40.4	AD,Ru	AD	AD	Re	184	Go 42.31x15.6	Go,Hyd	Aer	Wh	AD,Ru,Mo
55'6"	*49'9⅞"*	*11'10½"*	*551.0*	*35.0*	*29.3*	*34.8*	*93.6*	*40.4*	*AD,Ru*	*AD*	*AD*	*Re*	*184*	*Go 42.31x15.6*	*Go,Hyd*	*Aer*	*Wh*	*AD,Ru,Mo*
55'6"	*49'9⅞"*	*11'10½"*	*551.0*	*35.0*	*29.3*	*34.8*	*93.6*	*40.4*	*AD,Ru*	*AD*	*AD*	*Re*	*184*	*Go 42.31x15.6*	*Go,Hyd*	*Aer*	*Wh*	*AD,Ru,Mo*
75'0"	*74'11½"*	*18'4¼"*	*1000.0*	*66.2*	*94.6*	*55.6*	*239.7*	*48.4*	*AD,Rv*	*AD*	*AD*	*Re*	*240*	*15–16x42½*	*Go,Hyd*	*Ol*	*Ty*	*AD,Rv,Mo*
75'0"	74'11½"	18'4¼"	1000.0	66.2	94.6	55.6	.....	.....	AD,Rv	AD	AD	Re	240	15–16x42½	Go,Hyd	Ol	Ty	AD,Rv,Mo
55'	38'7"	10'1"	458.3	29.5	17.7	19.5	69.5	35.0	AD,Rv	AD	AD	Re	.....	Go 35x15–6	Go,Hyd	Aer	Wh	AD,Rv,AD
55'	38'7"	10'1"	458.3	29.5	17.7	19.5	69.5	35.0	AD,Rv	AD	AD	Re	.....	Go 35x15–6	Go,Hyd	Aer	Wh	AD,Rv,AD
79'6"	36'4"	9'11"	352.0	22.1	13.6	17.3	54.4	33.8	AD,Rv	AD	AD	Re	13'6"	Go 11.0x12	Gr,Pal	Aer	Wh	AD,Rv,AD
157'	91'10"	27'2¼"[29]	2300.0	113.3	148.6	72.4	233.4	124.8	D	D	D	.....	.....	.....	.....	.....	.....	D,Rv,D
118'2"	68'	21'5"	1340.0	103.7	64.0	62.0	146.0	79.4	D,Trs	D	D,Fab	.....	.....	.....	.....	.....	.....	D,Rv
86'	51'2"	17'8"	780.6	53.2	35.4	30.6	86.4	41.7	D,Box	D	D,Fab	Re	134	Ha,Aut,17x45	Hyd	Ol	Wh	D,Rv
86'	52'3"	17'8"	780.6	53.2	26.8	30.74	86.4	58.47	D,Box	D	D,Fab	Re	134	Ha,Aut,17x45	Hyd	Ol	Wh	D,Rv
122'	79'3"	27'7¼"	*1670.0*	.....	.....	.....	.....	.....	*D,Trs*	*D*	*D,Fab*	.....	.....	.....	.....	.....	.....	*D,Rv*

es. These refer to tables on pages 105 and 106 also.

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45 minute reserve

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nose wheel.
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[15] Plastic (Polyvinyl acetate bonded) pressure molded; entire body structure of HM-5, including tail surfaces, are molded.
[16] Aileron area aft of hinge line.
[17] Passenger seats only.
[18] Night arrangement.
[19] Seating arrangements optional.
[20] Maximum gross weight 45,000 lb.
[21] Minimum speed, power on, level flight. Restricted control, stall not possible.
[22] Mahogany and spruce truss and mahogany web.
[23] Has been approved by West Coast Office, C.A.A.
[24] Range at 200 mph.at 12,000 feet.
[25] Flaps.
[26] Patented " x " braced wing.
[27] Geared engine.
[28] Rm, Ri.
[29] On beaching gear.
[30] At 60% full power.
[31] At 60% power
[32] Disc Loading.
[33] Rotor diameter.
[34] Rotor disc.
[35] Trim flaps.
[36] Step tapered elliptical.
[37] Steerable and castering.
[38] High pressure.
[39] Structure approved for ski-plane.
[40] Franklin 80 and 90 empty weights include electric starter and motor driven generator.
[41] Steerable tail wheel.
[42] Ship is metal-covered to rear cabin; center section flap; sliding hatch; counter-balanced ailerons; trimming tabs on elevators.
[43] Cantilever.
[44] Oil and spring.
[45] Plastic bonded, wood veneer webs.
[46] Plastic bonded.
[47] May be equipped with Piper S-1000 skiis.
[48] Radio installation available.
[49] Also as photographic plane or with floats or skiis.
[50] Also available with 45 gallon and 52½ gallon capacity.
[51] Placarded V/L; actual high speed 169 mph.
[52] Also available with 160 gal. capacity.
[53] Also available with 21 in. streamlines or 22x10-4 wheels with hydraulic brakes.
[54] With 2-position propeller.
[55] All range figures with 15% reserve fuel.
[56] Navy model.
[57] 7.50 x 10 front.
[58] Steerable tail wheel available.

Geared Pow

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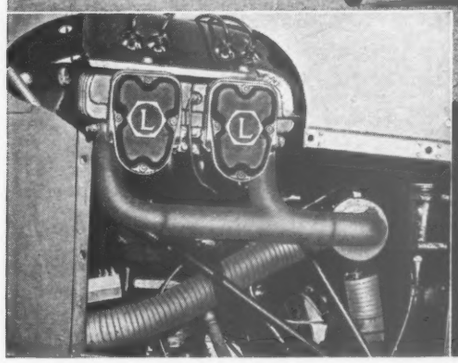
QUICKER TAKE-OFF ★ FASTER CLIMB ★ EXT



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Lycoming *Geared* "75" Installed in the Piper Three-place Cruiser

Whether you buy a Piper Cruiser for passenger carrying, private flying or student instruction you'll like power by the Lycoming *Geared* "75." Other air-cooled, horizontally opposed Lycoming engines are available in direct-drive models of 50 to 175 horsepower, single or dual magneto ignition with provision for *mechanical or electric starter,* generator and fuel pump drives.

A Full Load "Gets Out in a Climb" Behind a Lycoming *Geared* "75"

The quicker take-off and faster climb of the Lycoming *Geared* "75" is most apparent under full-load conditions—when you have extra need for plus performance.

YOU who buy or fly the Piper three-p consider the superior performance and operating costs of the Lycoming *Geared* 75- suited to the Cruiser's greater load-carryi *Geared* "75" develops its horsepower faste quicker and rate-of-climb better. Higher e turning, larger-diameter propeller, makes ness. The recognized economy of higher p amazingly low gasoline consumption . . gallons per hour at cruising! Fly this depe the Piper Cruiser and feel the difference *gea*

FREE LITERATURE:—on Lycoming 50 to 75-h be obtained from all Piper, Aeronca, Funk, Luscombe, Or write Lycoming Division, Dept. AA21, Aviation Ma port, Penna., U.S.A. . . . Cable address: Aviatcor.

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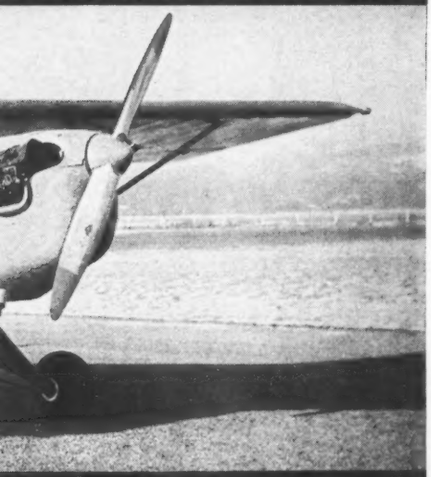

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Piper three-place Cruiser will want to
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ing *Geared* 75-horsepower engine. Ideally
r load-carrying capacity, the Lycoming
sepower faster. Consequently, take-off is
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peller, makes for incomparable smooth-
y of higher piston speeds is reflected in
sumption . . . approximately only 4½
Fly this dependable Lycoming engine in
difference *geared* power makes.

oming 50 to 75-horsepower light-plane engines may
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A21, Aviation Manufacturing Corporation, Williams-
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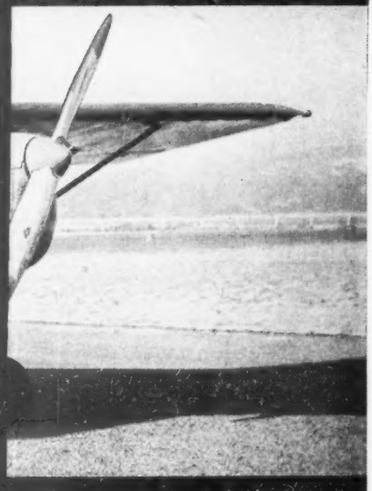

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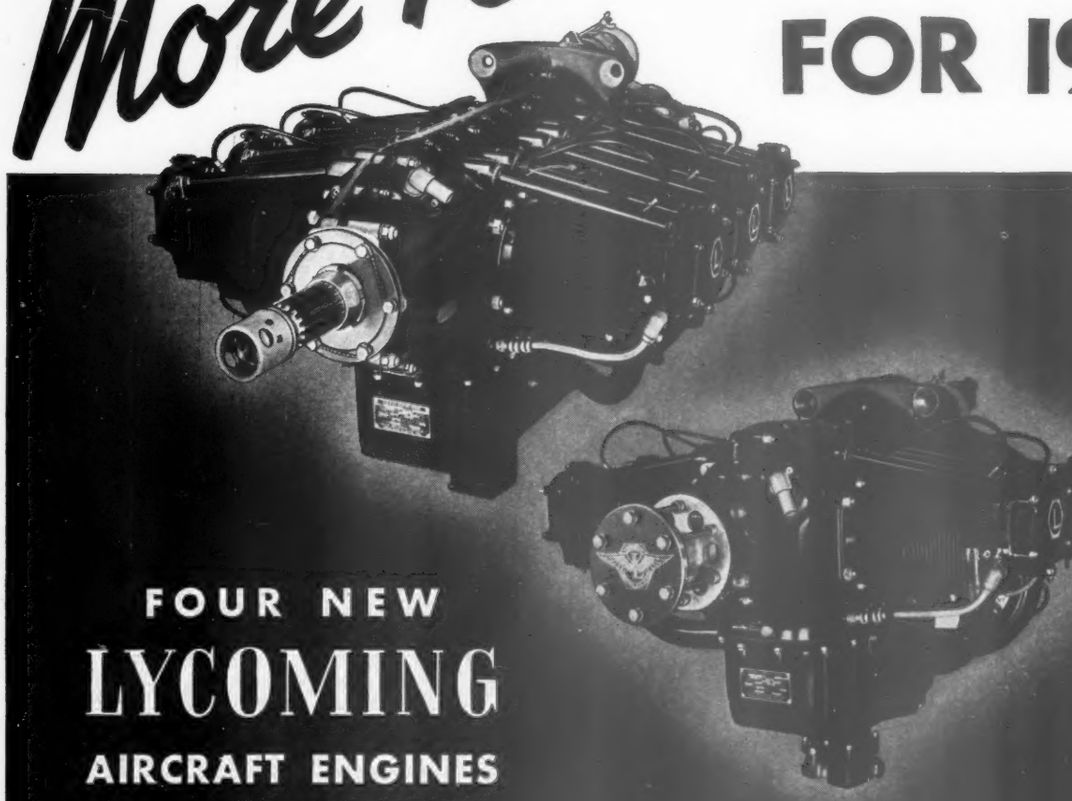

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A four-cylinder, direct-drive engine with 235 cubic-inch displacement.

★ **THE 125 H.P. O-290**
A four-cylinder, direct-drive engine with 290 cubic-inch displacement.

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engine
displa

★ **THE 1**
A six-
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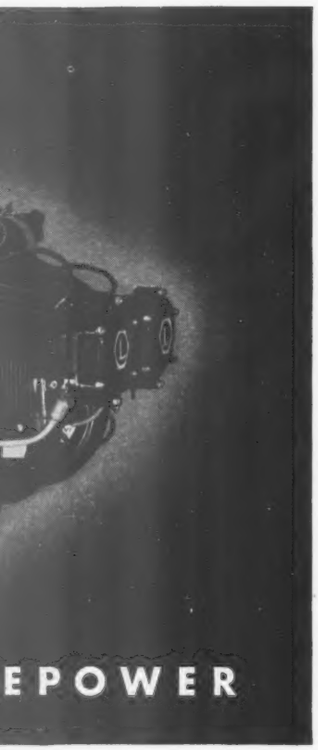

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★ **THE 150 H.P. O-350**
A six-cylinder, direct-drive engine with 350 cubic-inch displacement.

★ **THE 175 H.P. O-435**
A six-cylinder, direct-drive engine with 435 cubic-inch displacement.

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MING
Engines

COMMERCIAL PLANES

American Aircraft Engine Specifications

AVIATION does not assume responsibility for the figures given

Manufacturer	Model	Cooling system	Number of cylinders	Cylinder arrangement	Propeller drive	Rating: Rated hp.	Rating: At r.p.m.	Rating: At altitude (ft.)	Rating: Octane fuel	Weights: Total dry without hub or starter	Weights: Lb. per hp.	Bore and stroke (in.)	Displacement (cu. in.)	Compression ratio	B.M.E.P.	Blower ratio	Dimensions: Dia. mount. ring or dist. between bearers	Dimensions: Ht. or O.D. (in.)	Dimensions: Length without starter	Guar. fuel cons. at 9 max. cruising hp. (lb. per hp. per hr.)	Maximum oil cons. at rated speed	Valve mechanism	Cylinder construction (See footnote)	Make spark plugs supplied with engine	Type ignition	Make ignition	Make of carburetors	Make of starter	Are exhaust manifolds provided	Shipping weight crated (lbs.)	D. of C. license number
Aeronautical Corp. of America	E-113C	A	2	HOpp	D	40	2540	S.L.	73	117	2.9	4¼x4	113.5	5.4	158	.....	.....	18	24	.55	.006	prr	Al,S	Op	M	B	Sg	.....	.....	210	71
Aeronautical Corp. of America	E-113CBD	A	2	HOpp	D	40	2500	S.L.	73	125	2.8	4¼x4	113.5	5.4	181	.....	.....	18	24	.58	.006	prr	Al,S	Op	2M	B	Sg	.....	.....	218	189
Aircooled Motors (Franklin)	4AC-150	A	4	HOpp	D	50	2300	S.L.	70 min.	158	.....	3⅝x3⅝	150.0	6.6	.....	.....	10"	18⅜	[10]27	.54	.00296	prr	Al-Ni	Ch	M	Eise	Marvel	.....	Yes	.....	194
Aircooled Motors (Franklin)	4AC-150 (Dual)	A	4	HOpp	D	50	2300	S.L.	70 min.	166	.....	3⅝x3⅝	150.0	5.5	.....	.....	10"	18⅜	[10]26 17/32	.54	.00296	prr	Al-Ni	Ch	M	Eise	Marvel	.....	Yes	.....	194
Aircooled Motors (Franklin)	4AC-171	A	4	HOpp	D	60	2350	S.L.	70 min.	158	.....	3⅞x3⅝	171.0	6.25	.....	.....	10"	18⅜	[10]27	.60	.00347	prr	Al-Ni	Ch	M	Eise	Marvel	.....	Yes	.....	206
Aircooled Motors (Franklin)	4AC-171 (Dual)	A	4	HOpp	D	60	2350	S.L.	70 min.	166	.....	3⅞x3⅝	171.0	6.25	.....	.....	10"	18⅜	[10]26 17/32	.60	.00347	prr	Al-Ni	Ch	M	Eise	Marvel	.....	Yes	.....	206
Aircooled Motors (Franklin)	4AC-171	A	4	HOpp	D	60	2350	S.L.	70 min.	204	.....	3⅞x3⅝	171.0	6.25	.....	.....	10"	22 3/16	[10]28 9/16	.60	.00347	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	Yes	.....	206
Aircooled Motors (Franklin)	4 AC-176-B2	A	4	HOpp	D	65	2200	S.L.	73	184	.....	4x3½	176	6.3	.....	.....	10⅝W, 12⅛L	19 17/32	30 1 1/16	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	.....	No	.....	221
Aircooled Motors (Franklin)	4AC-176-F3	A	4	HOpp	D	80	2500	S.L.	80	218	.....	4x3½	176	7.	.....	.....	10⅝W, 12⅛L	19 17/32	30 1 1/16	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	No	.....	221
Aircooled Motors (Franklin)	4AC-199-E3	A	4	HOpp	D	90	2500	S.L.	80	226	.....	4¼x3½	199	7.	.....	.....	10⅝W, 12⅛L	19 17/32	30 1 1/16	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	No	.....	Pdg
Aircooled Motors (Franklin)	6AC-264-F3	A	6	HOpp	D	120	2600	S.L.	80	282	.....	4x3½	264	6.3	.....	.....	10⅝W, 18⅛L	19 17/32	40	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	No	.....	222
Aircooled Motors (Franklin)	6AC-298-F3	A	6	HOpp	D	130	2550	S.L.	80	295	.....	4¼x3½	298	7.	.....	.....	10⅝W, 18⅛L	19 17/32	40	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	No	.....	225
Akron Aircraft, Inc	Funk E200-E4L	W	4	LId	D	63	2125	S.L.	70	260	3.7	3⅞x4¼	200.5	6.25	116.7	.....	.....	25	35	.592	.0035	Lh	C	B	M	B	Z	.....	.....	.....	201
Allison Engrg. Co	V-1710-C10	W	12	V	G5	1150	2950	S.L.	87	1300	1.13	5½x6	1710.5	6.00	178	6.44	18⅜	42 19/32	94 15/32	.60	.025	ohc[2]	Al,S	BG	DM	Sc	Sg	Ec	No	1970	177
Allison Engrg. Co	V-1710-C15	W	12	V	G5	1090	3000	13200	100	1320	1.21	5½x6	1710.5	6.65	172	8.77	18⅜	41⅞	98½	.65	.025	ohc[2]	Al,S	Op	DM	Sc	Sg	Ec	No	2010	....
Allison Engrg. Co	V-1710-F3R	W	12	V	G5	1150	3000	12000	100	1290	1.12	5½x6	1710.5	6.65	172	8.80	18⅜	36½	88⅜	.65	.025	ohc[2]	Al,S	Op	DM	Sc	Sg	Ec	No	1990	....
Aviation Mfg. Corp. (Lycoming)	O-145-A2	A	4	HOpp	D	55	2300	S.L.	73	165.5	3.01	3.625x3.5	144.5	5.65	119	.....	8.5W, 10.25T	20.59	24.63	.55	.010	prr	Al,C	Fg	2M	Sc	Marvel	.....	No	210	199

Aircooled Motors (Franklin)	4AC-176-F3	A	4	HOpp	D	80	2500	S.L.	80	218		4x3½	176	7.			10⅝W, 12½L	19³¹/₃₂	30¹¹/₁₆	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	No		221
Aircooled Motors (Franklin)	4AC-199-E3	A	4	HOpp	D	90	2500	S.L.	80	226		4¼x3½	199	7.			10⅝W, 12½L	19³¹/₃₂	30¹¹/₁₆	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	No		Pdg
Aircooled Motors (Franklin)	6AC-264-F3	A	6	HOpp	D	120	2600	S.L.	80	282		4x3½	264	6.3			10⅝W, 18½L	19³¹/₃₂	40	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	No		222
Aircooled Motors (Franklin)	6AC-298-F3	A	6	HOpp	D	130	2550	S.L.	80	295		4¼x3½	298	7.			10⅝W, 18½L	19³¹/₃₂	40	.50	.003	prr	Al-Ni	Ch	M	Eise	Marvel	Auto-lite	No		225
Akron Aircraft, Inc.	Funk E200-E4L	W	4	LId	D	63	2125	S.L.	70	260	3.7	3⅞x4¼	200.5	6.25	116.7			25	35	.592	.0035	Lh	C	B	M	B	Z				201
Allison Engrg. Co.	V-1710-C10	W	12	V	G5	1150	2950	S.L.	87	1300	1.13	5½x6	1710.5	6.00	178	6.44	18⅜	42¹⁹/₃₂	94¹⁵/₃₂	.60	.025	ohc²	Al,S	BG	DM	Se	Sg	Ec	No	1970	177
Allison Engrg. Co.	V-1710-C15	W	12	V	G5	1090	3000	13200	100	1320	1.21	5½x6	1710.5	6.65	172	8.77	18⅜	41⅞	98½	.65	.025	ohc²	Al,S	Op	DM	Se	Sg	Ec	No	2010	....
Allison Engrg. Co.	V-1710-F3R	W	12	V	G5	1150	3000	12000	100	1290	1.12	5½x6	1710.5	6.65	172	8.80	18⅜	36½	88⅜	.65	.025	ohc²	Al,S	Op	DM	Se	Sg	Ec	No	1990	....
Aviation-Mfg. Corp. (Lycoming)	O-145-A2	A	4	HOpp	D	55	2300	S.L.	73	165.5	3.01	3.625x3.5	144.5	5.65	119		8.5W, 10.25L	20.59	24.63	.55	.010	prr	Al,C	ES	2M	Se	Marvel		No	210	199
Aviation-Mfg. Corp. (Lycoming)	O-145-A3	A	4	HOpp	D	55	2300	S.L.	73	167.5	3.05	3.625x3.5	144.5	5.65	119		8.5W, 10.25L	22.58	24.63	.55	.010	prr	Al,C	ES	2M	Se	Marvel	Ec	No	212	199
Aviation-Mfg. Corp. (Lycoming)	O-145-B2	A	4	HOpp	D	65	2550	S.L.	73	165.5	2.55	3.625x3.5	144.5	6.5	140		8.5W, 10.25L	20.59	24.63	.50	.010	prr	Al,C	ES	2M	Se	Marvel		No	210	210
Aviation-Mfg. Corp. (Lycoming)	O-145-B3	A	4	HOpp	D	65	2550	S.L.	73	167.5	2.58	3.625x3.5	144.5	6.5	140		8.5W, 10.25L	22.59	24.63	.50	.010	prr	Al,C	ES	2M	Se	Marvel	Ec	No	212	210
Aviation-Mfg. Corp. (Lycoming)	O-145-C2	A	4	HOpp	D	75	3100	S.L.	73	165.5	2.21	3.625x3.5	144.5	6.5	133		8.5W, 10.25L	20.59	24.63	.50	.010	prr	Al,C	ES	2M	Se	Marvel		No	210	210
Aviation-Mfg. Corp. (Lycoming)	O-145-C3	A	4	HOpp	D	75	3100	S.L.	73	167.5	2.23	3.625x3.5	144.5	6.5	133		8.5W, 10.25L	22.59	24.63	.50	.010	prr	Al,C	ES	2M	Se	Marvel	Ec	No	122	210
Aviation-Mfg. Corp. (Lycoming)	GO-145-C2	A	4	HOpp	G	75	3200	S.L.	73	193	2.57	3.625x3.5	144.5	6.5	128		8.5W, 10.25L	20.59	29.31	.50	.010	prr	Al,C	ES	2M	Se	Marvel		No	245	210
Aviation-Mfg. Corp. (Lycoming)	GO-145-C3	A	4	HOpp	G	75	3200	S.L.	73	195	2.60	3.625x3.5	144.5	6.5	128		8.5W, 10.25L	22.59	29.31	.50	.010	prr	Al,C	ES	2M	Se	Marvel	Ec	No	246	210
Aviation-Mfg. Corp. (Lycoming)	R-680-D5	A	9	Rad	D	260	2300	S.L.	80	505	1.94	4.625x4.5	680.4	6.5	132	1.0	19.25		43.5	37.04	.50	.020	prr	Al,S	BG	DM	Se	Sg	Ec	No	1042	172
Aviation-Mfg. Corp. (Lycoming)	R-680-D6	A	9	Rad	D	245	2300	S.L.	73	505	2.06	4.625x4.5	680.4	5.5	124	1.0	19.25		43.5	37.04	.50	.020	prr	Al,S	BG	DM	Se	Sg	Ec	No	1042	173
Aviation-Mfg. Corp. (Lycoming)	R-680-B4D	A	9	Rad	D	225	2100	S.L.	73	492	2.19	4.625x4.5	680.4	5.5	125	1.0	19.25		43.5	37.04	.52	.020	prr	Al,S	BG	DM	Se	Sg	Ec	No	1028	108
Aviation-Mfg. Corp. (Lycoming)	R-680-E1	A	9	Rad	D	290	2300	S.L.	80	514	1.77	4.625x4.5	680.4	6.2	147	1.0	19.25		43.5	37.04	.50	.020	prr	Al,S	BG	DM	Se	Sg	Ec	No	1051	202
Aviation-Mfg. Corp. (Lycoming)	R-680-E2	A	9	Rad	D	280	2300	S.L.	73	514	1.84	4.625x4.5	680.4	5.5	142	1.0	19.25		43.5	37.04	.50	.020	prr	Al,S	BG	DM	Se	Sg	Ec	No	1051	202
Aviation-Mfg. Corp. (Lycoming)	R-680-E3	A	9	Rad	D	300	2300	S.L.	87	514	1.71	4.625x4.5	680.4	7.0	152	1.0	19.25		43.5	37.04	.50	.020	prr	Al,S	BG	DM	Se	Sg	Ec	No	1051	202
Aviation-Mfg. Corp. (Lycoming)	R-680-E3A	A	9	Rad	D	300	2300	S.L.	87	515	1.72	4.625x4.5	680.4	7.0	152	1.0	19.25		43.5	37.50	.50	.020	prr	Al,S	BG	DM	Se	Sg	Ec	No	1041	202
Aviation-Mfg. Corp. (Lycoming)	O-235	A	4	HOpp	D	100	2500	S.L.	73	223	2.23	4.375x3.875	233.3	6.25	136			24.99	36.39	.50	.010	prr	Al,S	Ch	2M	Se	Sg or Marvel	Ec	No		....
Aviation-Mfg. Corp. (Lycoming)	O-290	A	4	HOpp	D	125	2500	S.L.	73	233	1.86	4.875x3.875	289	6.25	137			24.99	36.39	.50	.010	prr	Al,S	Ch	2M	Se	Sg or Marvel	Ec	No		....
Aviation-Mfg. Corp. (Lycoming)	O-350	A	6	HOpp	D	150	2500	S.L.	73	325	2.12	4.375x3.875	349.5	6.25	136			27.75	47.98	.50	.010	prr	Al,S	Ch	2M	Se	Sg or Marvel	Ec	No		....
Aviation-Mfg. Corp. (Lycoming)	O-435	A	6	HOpp	D	175	2300	S.L.	73	332	1.90	4.875x3.875	434	6.25	139			27.75	47.98	.50	.010	prr	Al,S	Ch	2M	Se	Sg,Mar.	Ec	No		....
Church Airplane & Mfg. Co.	No. 248	A	8	V-8	D	93	2900	S.L.	73	332	3.4	3¼x3¾	248	5.7:1	133			24½	28½	.54	.015	Lh		Op	Bat	Ford	Sg	Ford	Yes	360	224
Continental Motors Corp.	A-50 Series 7	A	4	HOpp	D	50	1900	S.L.	65	161	3.22	3⅞x3⅝	171	5.4:1				22⁹/₁₆	30¹³/₃₂	.54	.005	prr	S	Ch	M	Se	Sg	None	No	338	190
Continental Motors Corp.	A-50 Series 8	A	4	HOpp	D	50	1900	S.L.	65	170	3.4	3⅞x3⅝	171	5.4:1				22⁹/₁₆	30²¹/₃₂	.54	.005	prr	S	Ch	DM	Se	Sg	None	No	348	190
Continental Motors Corp.	A-50 Series 9	A	4	HOpp	D	50	1900	S.L.	65	176	3.52	3⅞x3⅝	171	5.4:1				22⁹/₁₆	32¹³/₃₂	.54	.005	prr	S	Ch	DM	Sg	Sg	Ec	No	353	190
Continental Motors Corp.	A-65 Series 7	A	4	HOpp	D	65	2300	S.L.	73	161	2.48	3⅞x3⅝	171	6.3:1				22⁹/₁₆	30¹³/₃₂	.56	.004	prr	S	Ch	M	Se	Sg	None	No	338	205
Continental Motors Corp.	A-65 Series 8	A	4	HOpp	D	65	2300	S.L.	73	170	2.62	3⅞x3⅝	171	6.3:1				22⁹/₁₆	30²¹/₃₂	.56	.004	prr	S	Ch	DM	Se	Sg	None	No	348	205
Continental Motors Corp.	A-65 Series 9	A	4	HOpp	D	65	2300	S.L.	73	176	2.71	3⅞x3⅝	171	6.3:1				22⁹/₁₆	32¹³/₃₂	.56	.004	prr	S	Ch	DM	Se	Sg	Ec	No	353	205
Continental Motors Corp.	A-75 Series 8	A	4	HOpp	D	75	2600	S.L.	73	170	2.27	3⅞x3⅝	171	6.3:1				22⁹/₁₆	30²¹/₃₂	.56	.003	prr	S	Ch	DM	Se	Sg	None	No	348	213
Continental Motors Corp.	A-75 Series 9	A	4	HOpp	D	75	2600	S.L.	73	176	2.35	3⅞x3⅝	171	6.3:1				22⁹/₁₆	32¹³/₃₂	.56	.003	prr	S	Ch	DM	Se	Sg	Ec	No	353	213
Continental Motors Corp.	A-80 Series 8	A	4	HOpp	D	80	2700	S.L.	80	170	2.13	3⅞x3⅝	171	7.5:1				22⁹/₁₆	30²¹/₃₂	.56	.003	prr	S	Ch	DM	Se	Sg	None	No	348	217
Continental Motors Corp.	A-80 Series 9	A	4	HOpp	D	80	2700	S.L.	80	176	2.2	3⅞x3⅝	171	7.5:1				22⁹/₁₆	32¹³/₃₂	.56	.003	prr	S	Ch	DM	Se	Sg	Ec	No	353	217
Continental Motors Corp.	W-670 Series 6A	A	7	Rad	D	220	2075	S.L.	65	465	2.12	5¼x4½	668	5.4:1			20	42¼	34³/₁₆	.51	.025	prr	S	Ch¹¹	DM⁷	Se	Sg	Ec	No	850	162
Continental Motors Corp.	W-670 Series MA	A	7	Rad	D	240	2200	S.L.	80	475	1.98	5¼x4½	668	6.1:1			20	42¼	34³/₁₆	.495	.025	prr	S	Ch¹¹	DM⁷	Se	Sg	Ec	No	860	162
Continental Motors Corp.	W-670 Series KA	A	7	Rad	D	225	2175	S.L.	65	465	2.07	5¼x4½	668	5.4:1			20	42¼	34³/₁₆	.50	.025	prr	S	Ch¹¹	DM⁷	Se	Sg	Ec	No	850	162
Guiberson Diesel Engine Co.	A-980	A	9	Rad	D	210	2000	S.L.	41	509	2.32	4¹³/₁₆x6	982.0	14.70	85		19¼	46	34	.44	.025	prr						Ec			....
Guiberson Diesel Engine Co.	A-918	A	9	Rad	D	250	2050	S.L.	.....	549	2.20	4¾x5¾	918.0	16.00	105		19¼	49	35	.43	.025	prr						Ec			....
Guiberson Diesel Engine Co.	A-1020	A	9	Rad	D	310	2150	S.L.	.....	653	2.11	5½x5½	1021.0	14.0	112		20	47	33⅜	.370	.015	prr						Co			220
Jacobs Air. Eng. Co.	L-4M	A	7	Rad	D	225¹	2000	S.L.	73	497	2.03⁴	5¼x5	757.0	5.38	116⁴		16½	43½	35²/₃₂	.50	.018	prr	Al,S	BG	2M	Se	Sg	Ec	No	1035	121
Jacobs Air. Eng. Co.	L-4MB	A	7	Rad	D	225¹	2000	S.L.	73	495	2.02⁴	5¼x5	757.0	5.38	116⁴		16½	43½	35²/₃₂	.50	.018	prr	Al,S	BG	1M⁶	Se	Sg	Ec	No	1050	121
Jacobs Air. Eng. Co.	L-4MA7	A	7	Rad	D	225¹	2000	S.L.	73	500	2.04⁴	5¼x5	757.0	5.38	116⁴		16½	43½	35²/₃₂	.50	.018	prr	Al,S	BG	2M	Se	Sg	Ec	No	1040	121
Jacobs Air. Eng. Co.	L-4PT⁵	A	7	Rad	D	225	2000	S.L.	65	515	2.29	5¼x5	757.0	5.38	118		22	43½	39¾	.51	.018	prr	Al,S	BG	2M	Se	Sg	Ec	No	1050	121
Jacobs Air. Eng. Co.	L-5M	A	7	Rad	D	285⁹	2000	S.L.	73	504	1.68⁴	5½x5	831.0	6.00	134⁴		16½	43½	35²/₃₂	.50	.018	prr	Al,S	BG	2M	Se	Sg	Ec	No	1045	156
Jacobs Air. Eng. Co.	L-5MB	A	7	Rad	D	285⁹	2000	S.L.	73	508	1.69⁴	5½x5	831.0	6.00	134⁴		16½	43½	35²/₃₂	.50	.018	prr	Al,S	BG	1M⁶	Se	Sg	Ec	No	1065	156
Jacobs Air. Eng. Co.	L-5MA7	A	7	Rad	D	285⁷	2000	S.L.	73	510	1.70⁴	5½x5	831.0	6.00	134⁴		16½	43½	35²/₃₂	.50	.018	prr	Al,S	BG	2M	Se	Sg	Ec	No	1050	156
Jacobs Air. Eng. Co.	L-6M	A	7	Rad	D	300⁷	2100	3700	80	557	1.69⁴	5½x5½	914.0	6.00	130⁴		16½	45⅝	36¹⁵/₁₆	.49	.025	prr	Al,S	BG	2M	Se	Sg	Ec	No	1110	195
Jacobs Air. Eng. Co.	L-6MB	A	7	Rad	D	300³	2100	3700	80	555	1.69⁴	5½x5½	914.0	6.00	130⁴		16½	45⅝	36¹⁵/₁₆	.49	.025	prr	Al,S	BG	1M⁶	Se	Sg	Ec	No	1110	195
Jacobs Air. Eng. Co.	L-6MA	A	7	Rad	D	300³	2100	3700	80	560	1.70⁴	5½x5½	914.0	6.00	130⁴		16½	45⅝	36¹⁵/₁₆	.49	.025	prr	Al,S	BG	2M	Se	Sg	Ec	No	1110	195
Kinner Motors, Inc.	K-5	A	5	Rad	D	100	1810	S.L.	73	275	2.75	4¼x5¼	372.0	5.10	118		14	45⅜	32⅝/₁₆	.55	.025	prr	Al,S	BG	2M	B,Sc	Hy,Sg	Ec	Yes	550	3
Kinner Motors, Inc.	B-5	A	5	Rad	D	125	1925	S.L.	73	312	2.5	4⅝x5¼	441.0	5.25	117		14	45⅜	32⅝/₁₆	.55	.025	prr	Al,S	BG	2M	B,Sc	Hy,Sg	Ec	Yes	570	51
Kinner Motors, Inc.	R-5-I	A	5	Rad	D	160	1975	S.L.	73	314	1.96	4⅞x5¼	490.0	5.00	130		14	45⅜	32⅝/₁₆	.55	.025	prr	Al,S	BG	2M	Se	Sg	Ec	Yes	590	77
Kinner Motors, Inc.	R-5-II	A	5	Rad	D	160	1850	S.L.	73	330	2.06	5x5½	540.0	5.50	127		14	45¹¹/₁₆	32⅝/₁₆	.55	.025	prr	Al,S	BG	2M	Se	Sg	Ec	Yes	615	153
Kinner Motors, Inc.	C-5	A	5	Rad	D	210	1900	S.L.	73	420	2.00	5⅝x5¾	715.0	5.25	122		19¼	50	36¼	.55	.025	prr	Al,S	BG	2M	Se	Sg	Ec	Yes	1000	62
Kinner Motors, Inc.	C-7	A	7	Rad	D	380	1800	S.L.	73	630	2.10	5⅝x6	1044.0	5.25	126		20	48¾	45¹³/₃₂	.55	.025	prr	Al,S	BG	2M	Se	Sg	Ec	Yes	1100	122
Kinner Motors, Inc.	SC-7	A	7	Rad	D	350	1900	5000	73	650	1.85	5⅝x6	1044.0	5.25	148	9.33	20	47¾	45¹³/₃₂	.55	.025	prr	Al,S	BG	2M	Se	Sg	Ec	Yes	1150	175
Lenape Aircraft Motors, Inc.	AR-3	A	3	Rad	D	50	2125	S.L.	73	150	3.00	4½x4	160.0	5.00	120		12½	34¼	23¹⁵/₁₆	.55	.009	prr	Al,S	BG	M	B	Sg		No	340	74
Lenape Aircraft Motors, Inc.	AR-340	A	3	Rad	D	40	2050	S.L.	73	150	3.75	4½x4	160.0	5.00	115		12½	34¼	23¹⁵/₁₆	.55	.010	prr	Al,S	ES	M	B	Sg		No	340	119
Lenape Aircraft Motors, Inc.	LM-3		3	Rad	D	52	2325	S.L.	73	138	.55	4½x4	160.4	4.9:1			12½	36	24	.55	.....	prr	Al,S	ES	DM	ES	Sg		No	250	203
Lenape Aircraft Motors, Inc.	LM-365		3	Rad	D	65	2350	S.L.	73	140	.55	4½x4	167	5.8:1			12½	36	24	.55	.....	prr	Al,S	ES	DM	ES	Sg		No	250	203
Lenape Aircraft Motors, Inc.	LM-375		3	Rad	D	75	2450	S.L.	73	142	.55	4¼x4	170.5	5.8:1			12½	36	24	.55	.....	prr	Al,S	ES	DM	ES	Sg		No	250	215
Lenape Aircraft Motors, Inc.	LM-5		5	Rad	D	95	2200	S.L.	73	192	.55	4½x4	275	5.1:1			12½	36	24	.55	.....	prr	Al,S	ES	DM	ES	Sg		No	350	212
Menasco Mfg. Co.	C6S-4 Super Buccaneer	A	6	LId	D	260	2300	7500	80	550	2.12	4¾x5½	544.9	5.5	164¹²	10.90	13½	30¹⁹/₃₂	71¼	.55	.025	prr	Al,S	BG	2M	Se	Sg	Ec	No	870	197
Menasco Mfg. Co.	D-4	A	4	LId	D	125	2197		73	300	2.4	4¾x5½	363	5.5:1	125		16⅝	29¼	48⁷/₁₆	.55	.015	prr	Al,S	BG	2M	Sc	Sg	Ec	No	540	67
Menasco Mfg. Co.	D-4-B	A	4	LId	D	150	2260	3000	80	318	2.12	4¾x5½	363	5.5:1	144	9.6:1	16⅝	29¼	49¹¹/₁₆ ⁸	.55	.025	prr	Al,S	BG	2M	Sc	Sg	Ec	No	558	....
Monocoupe Corporation	Lambert R-266	A	5	Rad	D	90	2375	S.L.	72	222	2.47	4¼x3¾	266.0	5.55			13¾	34¼	30⅜	.55	.025	prr	S	Ch	M	Se	Sg	Ec	No	421	38
National Airplane & Motor Co.	National 35	A	2	Opp		35	2400	4000		95		4x3⅞	98	6				18	22	.55	.....		S	ES	M	ES					....
Pratt & Whitney	Wasp Jr. T1B3	A	9	Rad	D	450	2300	S.L.	87	668	1.48	5³¹/₁₆x5³¹/₁₆	985	6:1	157	10:1	23⅜		46.19	42.38	.48	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		Pdg
Pratt & Whitney	Wasp Jr. SB3	A	9	Rad	D	400	2200	5000	80	668	1.48	5³¹/₁₆x5³¹/₁₆	985	6:1	146	10:1	23⅜		46.19	42.38	.48	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		Pdg
Pratt & Whitney	Wasp S1H1	A	9	Rad	D	550	2200	8000	87	864	1.44	5¾x5¾	1344	6:1	148	12:1	23⅜		51.75	42.94	.49	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		129
Pratt & Whitney	Wasp S3H1	A	9	Rad	D	550	2200	5000	80	864	1.44	5¾x5¾	1344	6:1	148	10:1	23⅜		51.75	42.94	.48	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		143
Pratt & Whitney	Wasp S1H1-G	A	9	Rad	.667	550	2200	8000	87	930	1.55	5¾x5¾	1344	6:1	148	12:1	23⅜		51.75	47.73	.49	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		129
Pratt & Whitney	Wasp S3H1-G	A	9	Rad	.667	550	2200	5000	80	930	1.55	5¾x5¾	1344	6:1	148	10:1	23⅜		51.75	47.73	.48	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		142
Pratt & Whitney	Twin Wasp S1C3-G	A	14	Rad	.667	1050	2550	7500	90	1438	1.20	5½x5½	1830	6.7:1	178	7.15:1	27		48.13	60.94	.46	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		186
Pratt & Whitney	Twin Wasp S3C4-G	A	14	Rad	.667	1100	2550	6200	95	1460	1.22	5½x5½	1830	6.7:1	188	7.15:1	27		48.13	62.75	.46	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		186
Pratt & Whitney	Twin Wasp S4C4-G	A	14	Rad	.667	1000 1050 900	2550 2550 2550	12500 7500 15400	90	1460	1.22	5½x5½	1830	6.7:1	178	8.47:1 7.15:1 8.47:1	27		48.13	62.75	.46	.025	prr	Al,S	Op	2M	Se	Sg	Op	No		186
Pratt & Whitney	Double Wasp S1A6-G	A	18	Rad	.5625	1500	2400	7500	100	2265	1.22	5¾x6	2804	6.7:1	177	1 spd.	30⅜		52.25	75.56	.44	.025	prr	Al,S	Op	Dble	Se	Sg	Op	No		Mil
Pratt & Whitney	Double Wasp S1A4-G	A	18	Rad	.5625	1500 1450	2400 2400	7500 13000	100	2300	1.24	5¾x6	2804	6.7:1	177	2 spd.	30⅜		52.25	75.56	.44	.025	prr	Al,S	Op	Dble 1M	Se	Sg	Op	No		Mil
Ranger Aircraft Engines	6-440C-2	A	6	LId	D	175	2450	S.L.	65	355	2.02	4½x5½	441	6.0	128²¹		17.63		31.00	52.91	.55	.025	ohc	Al,S	BG	M	Se	Sg	Op	No		216
Ranger Aircraft Engines	6-440C-3	A	6	LId	D	180	2450	S.L.	73	355	1.97	4½x5½	441	6.0	132²¹		17.63		31.00	52.91	.53	.025	ohc	Al,S	BG	M	Se	Sg	Op	No		....
Ranger Aircraft Engines	6-440C-4	A	6	LId	D	190	2450	S.L.	80	355	1.87	4½x5½	441	6.5	139²¹		17.63		31.00	52.91	.52	.025	ohc	Al,S	BG	M	Se	Sg	Op	No		....
Ranger Aircraft Engines	6-440C-5	A	6	LId	D	200	2450	S.L.	87	355	1.78	4½x5½	441	7.5	146²¹		17.63		31.00	52.91	.48	.025	ohc	Al,S	BG	M	Se	Sg	Op	No		207
Ranger Aircraft Engines	SGV-770B-7	A	12	VId	GI	450	3000	12000	87	715	1.58	4x5½	773	6.5	154²¹	9.5	22.032	34½	64⁹/₃₂	.51	.025	ohc	Al,S	BG	M	Se	Sg	Op	No		207
Rearwin Aircraft & Engines, Inc.	5-E Ken-Royce	A	5	Rad	D	70	1950	S.L.	65	245	3.5	4½x3¾	250.5	5.55:1	116			33¼	23¾	.60	.015	prr	C	Ch	2M	Se	Sg	Ec	No	415	48
Rearwin Aircraft & Engines, Inc.	5-G Ken-Royce	A	5	Rad	D	90	2250	S.L.	65	226	2.51	4¼x3¾	266.0	6.1:1	121			33¼	23¾	.55	.015	prr	Al,S	Ch	2M	Se	Hy	Ec	No	390	46
Rearwin Aircraft & Engines, Inc.	7-G Ken-Royce	A	7	Rad	D	120	2225	S.L.	73	285	2.37½	4¼x3¾	372	6.1:1	114			33¼	24.56	.57	.015	prr	Al,S	Ch	2M	Se	Hy	Ec	No	460	52
Sky Motors	70-A	A	4	L	D	60	2050	S.L.	73	178	2.9	3⅞x4¼	200	6.25	120		13½		2.9	37	.55	.011	ohc	D,Al	ES	DM	ES	Link	Op	No	300	200
Warner Aircraft Corporation	Super Scarab Ser. 50	A	7	Rad	D	145	2050	S.L.	73	305	2.10	4⅝x4¼	499.0	5.30	115		17	36⁹/₁₆	28¹⁵/₃₂	.55	.025	prr	Al,S	BG	2M	Se	Sg,Hy	Ec	No	500	104
																	17	36⁹/₁₆	28¹⁵/₃₂	.55	.025	prr	Al,S	Ch	2M	Se	Sg,Hy	Ec	No	480	2

Aviation-Mfg. Corp. (Lycoming)	O-145-C2	A	4	HOpp	D	75	3100	S.L.	73	165.5	2.21	3.625x3.5	144.5	6.5	133	.....	8.5W, 10.25L	20.59	24.63	.50	.010	prr	A1,C	ES	2M	Sc	Marvel	.....	No	210	210
Aviation-Mfg. Corp. (Lycoming)	O-145-C3	A	4	HOpp	D	75	3100	S.L.	73	167.5	2.23	3.625x3.5	144.5	6.5	133	.....	8.5W, 10.25L	22.59	24.63	.50	.010	prr	A1,C	ES	2M	Sc	Marvel	Ec	No	122	210
Aviation-Mfg. Corp. (Lycoming)	GO-145-C2	A	4	HOpp	G	75	3200	S.L.	73	193	2.57	3.625x3.5	144.5	6.5	128	.....	8.5W, 10.25L	20.59	29.31	.50	.010	prr	A1,C	ES	2M	Sc	Marvel	.....	No	245	210
Aviation-Mfg. Corp. (Lycoming)	GO-145-C3	A	4	HOpp	G	75	3200	S.L.	73	195	2.60	3.625x3.5	144.5	6.5	128	.....	8.5W, 10.25L	22.59	29.31	.50	.010	prr	A1,C	ES	2M	Sc	Marvel	Ec	No	246	210
Aviation-Mfg. Corp. (Lycoming)	R-680-D5	A	9	Rad	D	260	2300	S.L.	80	505	1.94	4.625x4.5	680.4	6.5	132	1.0	19.25	43.5	37.04	.50	.020	prr	A1,S	BG	DM	Sc	Sg	Ec	No	1042	172
Aviation-Mfg. Corp. (Lycoming)	R-680-D6	A	9	Rad	D	245	2300	S.L.	73	505	2.06	4.625x4.5	680.4	5.5	124	1.0	19.25	43.5	37.04	.50	.020	prr	A1,S	BG	DM	Sc	Sg	Ec	No	1042	173
Aviation-Mfg. Corp. (Lycoming)	R-680-B4D	A	9	Rad	D	225	2100	S.L.	73	492	2.19	4.625x4.5	680.4	5.5	125	1.0	19.25	43.5	37.04	.52	.020	prr	A1,S	BG	DM	Sc	Sg	Ec	No	1028	108
Aviation-Mfg. Corp. (Lycoming)	R-680-E1	A	9	Rad	D	290	2300	S.L.	80	514	1.77	4.625x4.5	680.4	6.2	147	1.0	19.25	43.5	37.04	.50	.020	prr	A1,S	BG	DM	Sc	Sg	Ec	No	1051	202
Aviation-Mfg. Corp. (Lycoming)	R-680-E2	A	9	Rad	D	280	2300	S.L.	73	514	1.84	4.625x4.5	680.4	5.5	142	1.0	19.25	43.5	37.04	.50	.020	prr	A1,S	BG	DM	Sc	Sg	Ec	No	1051	202
Aviation-Mfg. Corp. (Lycoming)	R-680-E3	A	9	Rad	D	300	2300	S.L.	87	514	1.71	4.625x4.5	680.4	7.0	152	1.0	19.25	43.5	37.04	.50	.020	prr	A1,S	BG	DM	Sc	Sg	Ec	No	1051	202
Aviation-Mfg. Corp. (Lycoming)	R-680-E3A	A	9	Rad	D	300	2300	S.L.	87	515	1.72	4.625x4.5	680.4	7.0	152	1.0	19.25	43.5	37.50	.50	.020	prr	A1,S	BG	DM	Sc	Sg	Ec	No	1041	202
Aviation-Mfg. Corp. (Lycoming)	O-235	A	4	HOpp	D	100	2500	S.L.	73	223	2.23	4.375x3.875	233.3	6.25	136	.....	.....	24.99	36.39	.50	.010	prr	A1,S	Ch	2M	Sc	Sg or Marvel	Ec	No	.....	.....
Aviation-Mfg. Corp. (Lycoming)	O-290	A	4	HOpp	D	125	2500	S.L.	73	233	1.86	4.875x3.875	289	6.25	137	.....	.....	24.99	36.39	.50	.010	prr	A1,S	Ch	2M	Sc	Sg or Marvel	Ec	No	.....	.....
Aviation-Mfg. Corp. (Lycoming)	O-350	A	6	HOpp	D	150	2500	S.L.	73	325	2.12	4.375x3.875	349.5	6.25	136	.....	.....	27.75	47.98	.50	.010	prr	A1,S	Ch	2M	Sc	Sg or Marvel	Ec	No	.....	.....
Aviation-Mfg. Corp. (Lycoming)	O-435	A	6	HOpp	D	175	2300	S.L.	73	332	1.90	4.875x3.875	434	6.25	139	.....	.....	27.75	47.98	.50	.010	prr	A1,S	Ch	2M	Sc	Sg,Mar.	Ec	No	.....	.....
Church Airplane & Mfg. Co.	No. 248	A	8	V-8	D	93	2900	S.L.	73	332	3.4	3¼x3¾	248	5.7:1	133	.....	.....	24½	28½	.54	.015	Lh	.....	Op	Bat	Ford	Sg	Ford	Yes	360	224
Continental Motors Corp.	A-50 Series 7	A	4	HOpp	D	50	1900	S.L.	65	161	3.22	3⅞x3⅝	171	5.4:1	.....	.....	.....	22 9/16	30 13/32	.54	.005	prr	S	Ch	M	Sc	Sg	None	No	338	190
Continental Motors Corp.	A-50 Series 8	A	4	HOpp	D	50	1900	S.L.	65	170	3.4	3⅞x3⅝	171	5.4:1	.....	.....	.....	22 9/16	30 21/32	.54	.005	prr	S	Ch	DM	Sc	Sg	None	No	348	190
Continental Motors Corp.	A-50 Series 9	A	4	HOpp	D	50	1900	S.L.	65	176	3.52	3⅞x3⅝	171	5.4:1	.....	.....	.....	22 9/16	32 1/32	.54	.005	prr	S	Ch	DM	Sg	Sg	Ec	No	353	190
Continental Motors Corp.	A-65 Series 7	A	4	HOpp	D	65	2300	S.L.	73	161	2.48	3⅞x3⅝	171	6.3:1	.....	.....	.....	22 9/16	30 13/32	.56	.004	prr	S	Ch	M	Sc	Sg	None	No	338	205
Continental Motors Corp.	A-65 Series 8	A	4	HOpp	D	65	2300	S.L.	73	170	2.62	3⅞x3⅝	171	6.3:1	.....	.....	.....	22 9/16	30 21/32	.56	.004	prr	S	Ch	DM	Sc	Sg	None	No	348	205
Continental Motors Corp.	A-65 Series 9	A	4	HOpp	D	65	2300	S.L.	73	176	2.71	3⅞x3⅝	171	6.3:1	.....	.....	.....	22 9/16	32 1/32	.56	.004	prr	S	Ch	DM	Sc	Sg	Ec	No	353	205
Continental Motors Corp.	A-75 Series 8	A	4	HOpp	D	75	2600	S.L.	73	170	2.27	3⅞x3⅝	171	6.3:1	.....	.....	.....	22 9/16	30 21/32	.56	.003	prr	S	Ch	DM	Sc	Sg	None	No	348	213
Continental Motors Corp.	A-75 Series 9	A	4	HOpp	D	75	2600	S.L.	73	176	2.35	3⅞x3⅝	171	6.3:1	.....	.....	.....	22 9/16	32 1/32	.56	.003	prr	S	Ch	DM	Sc	Sg	Ec	No	353	213
Continental Motors Corp.	A-80 Series 8	A	4	HOpp	D	80	2700	S.L.	80	170	2.13	3⅞x3⅝	171	7.5:1	.....	.....	.....	22 9/16	30 21/32	.56	.003	prr	S	Ch	DM	Sc	Sg	None	No	348	217
Continental Motors Corp.	A-80 Series 9	A	4	HOpp	D	80	2700	S.L.	80	176	2.2	3⅞x3⅝	171	7.5:1	.....	.....	.....	22 9/16	32 1/32	.56	.003	prr	S	Ch	DM	Sc	Sg	Ec	No	353	217
Continental Motors Corp.	W-670 Series 6A	A	7	Rad	D	220	2075	S.L.	65	465	2.12	5½x4⅝	668	5.4:1	.....	.....	20	42¼	34 3/16	.51	.025	prr	S	Ch[11]	DM[7]	Sc	Sg	Ec	No	850	162
Continental Motors Corp.	W-670 Series MA	A	7	Rad	D	240	2200	S.L.	80	475	1.98	5½x4⅝	668	6.1:1	.....	.....	20	42¼	34 3/16	.495	.025	prr	S	Ch[11]	DM[7]	Sc	Sg	Ec	No	860	162
Continental Motors Corp.	W-670 Series KA	A	7	Rad	D	225	2175	S.L.	65	465	2.07	5½x4⅝	668	5.4:1	.....	.....	20	42¼	34 3/16	.50	.025	prr	S	Ch[11]	DM[7]	Sc	Sg	Ec	No	850	162
Guiberson Diesel Engine Co.	A-980	A	9	Rad	D	210	2000	S.L.	41	509	2.32	4 13/16x6	982.0	14.70	85	.....	19¼	46	34	.44	.025	prr	.....	.....	.....	.....	.....	Ec	.....	.....	.....
Guiberson Diesel Engine Co.	A-918	A	9	Rad	D	250	2050	S.L.	.....	549	2.20	4¾x5¾	918.0	16.00	105	.....	19¼	49	35	.43	.025	prr	.....	.....	.....	.....	.....	Ec	.....	.....	.....
Guiberson Diesel Engine Co.	A-1020	A	9	Rad	D	310	2150	S.L.	.....	653	2.11	5½x5½	1021.0	14.0	112	.....	20	47	33⅜	.370	.015	prr	.....	.....	.....	.....	.....	Co	.....	.....	220
Jacobs Air. Eng. Co.	L-4M	A	7	Rad	D	225[1]	2000	S.L.	73	497	2.03[4]	5¼x5	757.0	5.38	116[4]	.....	16½	43½	35 7/32	.50	.018	prr	A1,S	BG	2M	Sc	Sg	Ec	No	1035	121
Jacobs Air. Eng. Co.	L-4MB	A	7	Rad	D	225[1]	2000	S.L.	73	495	2.02[4]	5¼x5	757.0	5.38	116[4]	.....	16½	43½	35 7/32	.50	.018	prr	A1,S	BG	1M[6]	Sc	Sg	Ec	No	1050	121
Jacobs Air. Eng. Co.	L-4MA7	A	7	Rad	D	225[1]	2000	S.L.	73	500	2.04[4]	5¼x5	757.0	5.38	116[4]	.....	16½	43½	35 7/32	.50	.018	prr	A1,S	BG	2M	Sc	Sg	Ec	No	1040	121
Jacobs Air. Eng. Co.	L-4PT[8]	A	7	Rad	D	225	2000	S.L.	65	515	2.29	5¼x5	757.0	5.38	118	.....	22	43½	39¾	.51	.018	prr	A1,S	BG	2M	Sc	Sg	Ec	No	1050	121
Jacobs Air. Eng. Co.	L-5M	A	7	Rad	D	285[9]	2000	S.L.	73	504	1.68[4]	5½x5	831.0	6.00	134[4]	.....	16½	43½	35 7/32	.50	.018	prr	A1,S	BG	2M	Sc	Sg	Ec	No	1045	156
Jacobs Air. Eng. Co.	L-5MB	A	7	Rad	D	285[9]	2000	S.L.	73	508	1.69[4]	5½x5	831.0	6.00	134[4]	.....	16½	43½	35 7/32	.50	.018	prr	A1,S	BG	1M[6]	Sc	Sg	Ec	No	1065	156
Jacobs Air. Eng. Co.	L-5MA7	A	7	Rad	D	285[7]	2000	S.L.	73	510	1.70[4]	5½x5	831.0	6.00	134[4]	.....	16½	43½	35 7/32	.50	.018	prr	A1,S	BG	2M	Sc	Sg	Ec	No	1050	156
Jacobs Air. Eng. Co.	L-6M	A	7	Rad	D	300[7]	2100	3700	80	557	1.69[4]	5½x5½	914.0	6.00	130[4]	.....	16½	45⅝	36 15/16	.49	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	No	1110	195
Jacobs Air. Eng. Co.	L-6MB	A	7	Rad	D	300[3]	2100	3700	80	555	1.69[4]	5½x5½	914.0	6.00	130[4]	.....	16½	45⅝	36 15/16	.49	.025	prr	A1,S	BG	1M[6]	Sc	Sg	Ec	No	1110	195
Jacobs Air. Eng. Co.	L-6MA	A	7	Rad	D	300[3]	2100	3700	80	560	1.70[4]	5½x5½	914.0	6.00	130[4]	.....	16½	45⅝	36 15/16	.49	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	No	1110	195
Kinner Motors, Inc.	K-5	A	5	Rad	D	100	1810	S.L.	73	275	2.75	4¼x5¼	372.0	5.10	118	.....	14	45⅜	32 9/16	.55	.025	prr	A1,S	BG	2M	B,Sc	Hy,Sg	Ec	Yes	550	3
Kinner Motors, Inc.	B-5	A	5	Rad	D	125	1925	S.L.	73	312	2.5	4⅝x5¼	441.0	5.25	117	.....	14	45⅜	32 9/16	.55	.025	prr	A1,S	BG	2M	B,Sc	Hy,Sg	Ec	Yes	570	51
Kinner Motors, Inc.	R-5-1	A	5	Rad	D	160	1975	S.L.	73	314	1.96	4⅞x5¼	490.0	5.00	130	.....	14	45⅜	32 9/16	.55	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	Yes	590	77
Kinner Motors, Inc.	R-5-II	A	5	Rad	D	160	1850	S.L.	73	330	2.06	5x5½	540.0	5.50	127	.....	14	45 1/16	32 9/16	.55	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	Yes	615	153
Kinner Motors, Inc.	C-5	A	5	Rad	D	210	1900	S.L.	73	420	2.00	5⅝x5¾	715.0	5.25	122	.....	19¼	50	36¼	.55	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	Yes	1000	62
Kinner Motors, Inc.	C-7	A	7	Rad	D	380	1800	S.L.	73	630	2.10	5⅝x6	1044.0	5.25	126	.....	20	48¼	45 13/32	.55	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	Yes	1100	122
Kinner Motors, Inc.	SC-7	A	7	Rad	D	350	1900	5000	73	650	1.85	5⅝x6	1044.0	5.25	148	9.33	20	47¾	45 13/32	.55	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	Yes	1150	175
Lenape Aircraft Motors, Inc.	AR-3	A	3	Rad	D	50	2125	S.L.	73	150	3.00	4½x4	160.0	5.00	120	.....	12½	34¼	23 15/16	.55	.009	prr	A1,S	BG	M	B	Sg	.....	No	340	74
Lenape Aircraft Motors, Inc.	AR-340	A	3	Rad	D	40	2050	S.L.	73	150	3.75	4½x4	160.0	5.00	115	.....	12½	34¼	23 15/16	.55	.010	prr	A1,S	ES	M	B	Sg	.....	No	340	119
Lenape Aircraft Motors, Inc.	LM-3	...	3	Rad	D	52	2325	S.L.	73	138	.55	4½x4	160.4	4.9:1	.....	.....	12½	36	24	.55	.....	prr	A1,S	ES	DM	ES	Sg	.....	No	250	203
Lenape Aircraft Motors, Inc.	LM-365	...	3	Rad	D	65	2350	S.L.	73	140	.55	4½x4	167	5.8:1	.....	.....	12½	36	24	.55	.....	prr	A1,S	ES	DM	ES	Sg	.....	No	250	203
Lenape Aircraft Motors, Inc.	LM-375	...	3	Rad	D	75	2450	S.L.	73	142	.55	4¼x4	170.5	5.8:1	.....	.....	12½	36	24	.55	.....	prr	A1,S	ES	DM	ES	Sg	.....	No	250	215
Lenape Aircraft Motors, Inc.	LM-5	...	5	Rad	D	95	2200	S.L.	73	192	.55	4½x4	275	5.1:1	.....	.....	12½	36	24	.55	.....	prr	A1,S	ES	DM	ES	Sg	.....	No	350	212
Menasco Mfg. Co.	C6S-4 Super Buccaneer	A	6	LId	D	260	2300	7500	80	550	2.12	4¾x5½	544.9	5.5	164[12]	10.90	13½	30 19/32	71¼	.55	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	No	870	197
Menasco Mfg. Co.	D-4	A	4	LId	D	125	2197	.....	73	300	2.4	4¾x5½	363	5.5:1	125	.....	16⅝	29¼	48 7/16	.55	.015	prr	A1,S	BG	2M	Sc	Sg	Ec	No	540	67
Menasco Mfg. Co.	D-4-B	A	4	LId	D	150	2260	3000	80	318	2.12	4¾x5½	363	5.5:1	144	9.6:1	16⅝	29¼	49 11/16 [8]	.55	.025	prr	A1,S	BG	2M	Sc	Sg	Ec	No	558	.....
Monocoupe Corporation	Lambert R-266	A	5	Rad	D	90	2375	S.L.	72	222	2.47	4½x3¾	266.0	5.55	.....	.....	13¾	34¼	30⅜	.55	.025	prr	S	Ch	M	Sc	Sg	Ec	No	421	38
National Airplane & Motor Co.	National 35	A	2	Opp	.....	35	2400	4000	....	95	.....	4x3⅞	98	6	.....	.....	.....	18	22	.55	.....	....	S	ES	M	ES	.....	.....	.....	.....	.....	.....
Pratt & Whitney	Wasp Jr. T1B3	A	9	Rad	D	450	2300	S.L.	87	668	1.48	5¾6x5 5/16	985	6:1	157	10:1	23⅜	46.19	42.38	.48	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	Pdg
Pratt & Whitney	Wasp Jr. SB3	A	9	Rad	D	400	2200	5000	80	668	1.48	5¾6x5 5/16	985	6:1	146	10:1	23⅜	46.19	42.38	.48	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	Pdg
Pratt & Whitney	Wasp S1H1	A	9	Rad	D	550	2200	8000	87	864	1.44	5¾x5¾	1344	6:1	148	12:1	23⅜	51.75	42.94	.49	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	129
Pratt & Whitney	Wasp S3H1	A	9	Rad	D	550	2200	5000	80	864	1.44	5¾x5¾	1344	6:1	148	10:1	23⅜	51.75	42.94	.48	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	143
Pratt & Whitney	Wasp S1H1-G	A	9	Rad	.667	550	2200	8000	87	930	1.55	5¾x5¾	1344	6:1	148	12:1	23⅜	51.75	47.73	.49	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	129
Pratt & Whitney	Wasp S3H1-G	A	9	Rad	.667	550	2200	5000	80	930	1.55	5¾x5¾	1344	6:1	148	10:1	23⅜	51.75	47.73	.48	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	142
Pratt & Whitney	Twin Wasp S1C3-G	A	14	Rad	.667	1050	2550	7500	90	1438	1.20	5½x5½	1830	6.7:1	178	7.15:1	27	48.13	60.94	.46	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	186
Pratt & Whitney	Twin Wasp S3C4-G	A	14	Rad	.667	1100	2550	6200	95	1460	1.22	5½x5½	1830	6.7:1	188	7.15:1	27	48.13	62.75	.46	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	186
Pratt & Whitney	Twin Wasp S4C4-G	A	14	Rad	.667	1000	2550	12500								8.47:1																
						1050	2550	7500	90	1460	1.22	5½x5½	1830	6.7:1	178	7.15:1	27	48.13	62.75	.46	.025	prr	A1,S	Op	2M	Sc	Sg	Op	No	....	186
						900	2550	15400								8.47:1																
Pratt & Whitney	Double Wasp S1A6-G	A	18	Rad	.5625	1500	2400	7500	100	2265	1.22	5¾x6	2804	6.7:1	177	1 spd.	30⅜	52.25	75.56	.44	.025	prr	A1,S	Op	Dble	Sc	Sg	Op	No	....	Mil
					.5625	1500	2400	7500	100	2300	1.24	5¾x6	2804	6.7:1	177	2 spd.	30⅜	52.25	75.56	.44	.025	prr	A1,S	Op	Dble	Sc	Sg	Op	No	....	Mil

Pratt & Whitney	Wasp S3H1	A	9	Rad	D	550	2200	5000	80	864	1.44	5¾x5¾	1344	6:1	148	10:1	23⅜			51.75	42.94	.48	.025	prr	Al,S	Op	2M	Sc	Sg	Op	No	....	143					
Pratt & Whitney	Wasp S1H1-G	A	9	Rad	.667	550	2200	8000	87	930	1.55	5¾x5¾	1344	6:1	148	12:1	23⅜			51.75	47.73	.49	.025	prr	Al,S	Op	2M	Sc	Sg	Op	No	....	129					
Pratt & Whitney	Wasp S3H1-G	A	9	Rad	.667	550	2200	5000	80	930	1.55	5¾x5¾	1344	6:1	148	10:1	23⅜			51.75	47.73	.48	.025	prr	Al,S	Op	2M	Sc	Sg	Op	No	....	142					
Pratt & Whitney	Twin Wasp S1C3-G	A	14	Rad	.667	1050	2550	7500	90	1438	1.20	5½x5½	1830	6.7:1	178	7.15:1	27			48.13	60.94	.46	.025	prr	Al,S	Op	2M	Sc	Sg	Op	No	....	186					
Pratt & Whitney	Twin Wasp S3C4-G	A	14	Rad	.667	1100	2550	6200	95	1460	1.22	5½x5½	1830	6.7:1	188	7.15:1	27			48.13	62.75	.46	.025	prr	Al,S	Op	2M	Sc	Sg	Op	No	....	186					
						1000	2550	12500								8.47:1																					
Pratt & Whitney	Twin Wasp S4C4-G	A	14	Rad	.667	1050	2550	7500	90	1460	1.22	5½x5½	1830	6.7:1	178	7.15:1	27			48.13	62.75	.46	.025	prr	Al,S	Op	2M	Sc	Sg	Op	No	....	186					
						900	2550	15400								8.47:1																					
Pratt & Whitney	Double Wasp S1A6-G	A	18	Rad	.5625	1500	2400	7500	100	2265	1.22	5¾x6	2804	6.7:1	177	1 spd.	30⅜			52.25	75.56	.44	.025	prr	Al,S	Op	Dble	Sc	Sg	Op	No	....	Mil					
Pratt & Whitney	Double Wasp S1A4-G	A	18	Rad	.5625	1500	2400	7500	100	2300	1.24	5¾x6	2804	6.7:1	177	2 spd.	30⅜			52.25	75.56	.44	.025	prr	Al,S	Op	Dble	Sc	Sg	Op	No	....	Mil					
						1450	2400	13000																		1M											
Ranger Aircraft Engines	6-440C-2	A	6	LId	D	175	2450	S.L.	65	355	2.02	4½x5½	441	6.0	128[21]	.....	17.63			31.00	52.91	.55	.025	ohc	Al,S	BG	M	So	Sg	Op	No	....	216					
Ranger Aircraft Engines	6-440C-3	A	6	LId	D	180	2450	S.L.	73	355	1.97	4½x5½	441	6.0	132[21]	.....	17.63			31.00	52.91	.53	.025	ohc	Al,S	BG	M	So	Sg	Op	No	....	....					
Ranger Aircraft Engines	6-440C-4	A	6	LId	D	190	2450	S.L.	80	355	1.87	4½x5½	441	6.5	139[21]	.....	17.63			31.00	52.91	.52	.025	ohc	Al,S	BG	M	So	Sg	Op	No	....	....					
Ranger Aircraft Engines	6-440C-5	A	6	LId	D	200	2450	S.L.	87	355	1.78	4½x5½	441	7.5	146[21]	.....	17.63			31.00	52.91	.48	.025	ohc	Al,S	BG	M	So	Sg	Op	No	....	....					
Ranger Aircraft Engines	SGV-770B-7	A	12	VId	GI	450	3000	12000	87	715	1.58	4x5½	773	6.5	154[21]	9.5	22.032			34½2	64⅝2	.51	.025	ohc	Al,S	BG	M	So	Sg	Op	No	....	207					
Rearwin Aircraft & Engines, Inc.	5-E Ken-Royce	A	5	Rad	D	70	1950	S.L.	65	245	3.5	4⅜x3¾	250.5	5.55:1	116	.....	.....			33¼	23¾	.60	.015	prr	C	Ch	2M	Sc	Sg	Ec	No	415	48					
Rearwin Aircraft & Engines, Inc.	5-G Ken-Royce	A	5	Rad	D	90	2250	S.L.	65	226	2.51	4¼x3¾	266.0	6.1:1	121	.....	.....			33¼	23¾	.55	.015	prr	Al,S	Ch	2M	Sc	Hy	Ec	No	390	46					
Rearwin Aircraft & Engines, Inc.	7-G Ken-Royce	A	7	Rad	D	120	2225	S.L.	73	285	2.37⅛	4¼x3¾	372	6.1:1	114	.....	.....			33¼	24.56	.57	.015	prr	Al,S	Ch	2M	Sc	Hy	Ec	No	460	52					
Sky Motors	70-A	A	4	L	D	60	2050	S.L.	73	178	2.9	3⅞x4¼	200	6.25	120	.....	13½			2.9	37	.55	.011	ohc	D,Al	ES	DM	ES	Link	Op	No	300	200					
Warner Aircraft Corporation	Super Scarab Ser. 50	A	7	Rad	D	145	2050	S.L.	73	305	2.10	4⅝x4¼	499.0	5.30	115	.....	17			36⅜6	28[15]32	.55	.025	prr	Al,S	BG	2M	So	Sg,Hy	Ec	No	500	104					
Warner Aircraft Corporation	Scarab	A	7	Rad	D	125	2050	S.L.	73	285	2.28	4¼x4¼	422.0	5.20	115	.....	17			36⅜6	28[15]32	.55	.025	prr	Al,S	Ch	2M	So	Sg,Hy	Ec	No	480	2					
Warner Aircraft Corporation	Scarab Junior	A	5	Rad	D	90	2025	S.L.	73	237	2.63	4.262x4¼	301.0	5.20	115	.....	17			36⅜6	28[15]32	.55	.025	prr	Al,S	Ch	M	So	Hy	Ec	No	430	54					
Warner Aircraft Corporation	Super Scarab SEK. 165	A	7	Rad	D	165	2100	S.L.	73	333	2.02	4⅝x4¼	499.0	6.40	125	.....	17½			37¼	30[25]64	.58	.025	prr	Al,S	Ch	M	So	Sg,Hy	Ec	No	540	214					
Welch Aircraft Developments	Welch O-2	A	2	Opp	D	45	2500	S.L.	.....	115	2.4	4½x4¼	135.0	5.20	.....	.....	.....			37¾	24½	.64	.020	prr	C	....	M	We	Z	We	No	.....	....					
Wright Aeronautical Corp	GR-1820-G202A	A	9	Rad	GI	1000	2300	4500	90	1290	1.29	6⅛x6⅞	1823	6.7	189	7.0	23⅜			55⅛	50.04	.67	.025	prr	Al,S	Op	2M	Sc	Sg,Hy	Op	No	2070	....					
Wright Aeronautical Corp	GR-1820-G203A	A	9	Rad	GI	950	2300	9100	90	1290	1.36	6⅛x6⅞	1823	6.7	180	8.31	23⅜			55⅛	50.04	.67	.025	prr	Al,S	Op	2M	Sc	Sg,Hy	Op	No	2070	....					
Wright Aeronautical Corp	GR-1820-G205A	A	9	Rad	GI	1000	2300	4500	90	1302	1.30	6⅛x6⅞	1823	6.7	189	7.14	23⅜			55⅛	50.04	.67	.025	prr	Al,S	Op	2M	Sc	Sg,Hy	Op	No	2070	....					
						900	2300	14000	90	.....	1.45	.....	.....	.....	171	10.0	23⅜			55⅛	50.04	.70	.025	prr	Al,S	Op	2M	So	Sg,Hy	Op	No	.....	....					
Wright Aeronautical Corp	R-760-E1	A	7	Rad	D	285	2100	S.L.	73	570	2.0	5x5½	756.0	6.10	142	7.05	19¼			45	42¾	.55	.020	prr	Al,S	BG	2M	So	Sg	Op	Yes	1065	94					
Wright Aeronautical Corp	R-760-ET	A	7	Rad	D	235	2000	S.L.	73	515	2.20	5x5½	756.0	6.10	123	.....	19¼			45	42¾	.55	.020	prr	Al,S	BG	2M	So	Sg	Op	Yes	1025	126					
Wright Aeronautical Corp	R-760-E2	A	7	Rad	D	320	2200	S.L.	80	570	1.78	5x5½	756.0	6.30	152	9.17	19¼			45	42¾	.55	.020	prr	Al,S	BG	2M	So	Sg	Op	Yes	1080	155					
Wright Aeronautical Corp	R-975-E1	A	9	Rad	D	365	2100	S.L.	73	660	1.81	5x5½	973.0	6.10	141	7.80	19¼			45	43½	.55	.020	prr	Al,S	BG	2M	So	Sg	Op	Yes	1200	87					
Wright Aeronautical Corp	R-975-E3	A	9	Rad	D	420	2200	1400	80	675	1.6	5x5½	973.0	6.30	155	10.15	19¼			45	43½	.55	.020	prr	Al,S	BG	2M	So	Sg	Op	Yes	1200	125					
Wright Aeronautical Corp	R-1820-F52	A	9	Rad	D	775	2100	5800	87	1000	1.29	6⅛x6⅞	1823.0	6.40	160	7.00	23⅜			54⅛	43⅜	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1700	148					
Wright Aeronautical Corp	GR-1820-F52	A	9	Rad	G3	760	2100	5800	87	1095	1.44	6⅛x6⅞	1823.0	6.40	157	7.00	23⅜			54⅛	47⅞	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1800	148					
Wright Aeronautical Corp	R-1820-F53	A	9	Rad	D	745	2100	9600	87	1000	1.34	6⅛x6⅞	1823.0	6.40	154	8.31	23⅜			54⅛	43⅜	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1700	149					
Wright Aeronautical Corp	GR-1820-F53	A	9	Rad	G3	730	2100	9600	87	1095	1.50	6⅛x6⅞	1823.0	6.40	151	8.31	23⅜			54⅛	47⅞	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1800	149					
Wright Aeronautical Corp	R-1820-F56	A	9	Rad	D	755	2100	11300	87	1000	1.32	6⅛x6⅞	1823.0	6.40	156	8.83	23⅜			54⅛	43⅜	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1700	159					
Wright Aeronautical Corp	GR-1820-F56	A	9	Rad	G3	740	2100	11300	87	1095	1.48	6⅛x6⅞	1823.0	6.40	153	8.83	23⅜			54⅛	47⅞	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1800	159					
Wright Aeronautical Corp	GR-1820-F62	A	9	Rad	G3	760	2100	5800	87	1095	1.44	6⅛x6⅞	1823.0	6.40	157	7.00	23⅜			54⅛	47⅞	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1800	148					
Wright Aeronautical Corp	GR-1820-G2	A	9	Rad	G3	850	2100	5800	87	1198	1.41	6⅛x6⅞	1823.0	6.45	176	7.00	23⅜			54¼	47¾	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1950	157					
Wright Aeronautical Corp	GR-1820-G3	A	9	Rad	G3	840	2100	8700	87	1198	1.43	6⅛x6⅞	1823.0	6.45	173	8.31	23⅜			54¼	47¾	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1950	171					
Wright Aeronautical Corp	GR-1820-G3B	A	9	Rad	G3	820	2100	8800	87	1198	1.46	6⅛x6⅞	1823.0	6.2:1	170	8.31	23⅜			54¼	47¾	.60	.025	prr	Al,S	BG	2M	So	Sg,Hy	Op	No	1950	171					
Wright Aeronautical Corp	GR-1820-G102A	A	9	Rad	G3	900	2300	6700	90	1260	1.4	6⅛x6⅞	1823.0	6.3:1	170	7.0:1	23⅜			55.1	48.12	.67	.025	prr	Al,S	Op	2M	So	Sg,Cg	Op	No	2050	169					
Wright Aeronautical Corp	GR-1820-G103A	A	9	Rad	G3	860	2300	11100	90	1260	1.46	6⅛x6⅞	1823.0	6.3:1	163	8.31:1	23⅜			55.1	48.12	.67	.025	prr	Al,S	Op	2M	So	Sg,Cg	Op	No	2050	180					
Wright Aeronautical Corp	R-1820-F55	A	9	Rad	D	675	2100	15300	87	1012	1.5	6⅛x6⅞	1823.0	6.4:1	140	10.00	23⅜			54.09	43.38	.67	.025	prr	Al,S	Op	2M	So	Sg	Op	No	....	198					
						760	2100	5800			1.33				157	7.14																					
Wright Aeronautical Corp	GR-1820-F55	A	9	Rad	G3	675	2100	15300	87	1107	1.64	6⅛x6⅞	1823.0	6.4:1	140	10.00	23⅜			54.09	47.81	.67	.025	prr	Al,S	Op	2M	So	Sg	Op	No	....	198					
						760	2100	5800			1.46				157	7.14																					
Wright Aeronautical Corp	GR-1820-F65	A	9	Rad	G3	675	2100	15300	87	1107	1.64	6⅛x6⅞	1823.0	6.4:1	140	10.00	23⅜			54.09	47.81	.67	.025	prr	Al,S	Op	2M	So	Sg	Op	No	....	198					
						760	2100	5800			1.46				157	7.14																					
Wrignt Aeronautical Corp	R-1820-G5	A	9	Rad	D	750	2100	15200	87	1115	1.49	6⅛x6⅞	1823.0	6.45:1	155	10.00	23⅜			54.25	43.25	.67	.025	prr	Al,S	Op	2M	So	Sg	Op	No	....	154					
						850	2100	6000			1.31				176	7.14																					
Wright Aeronautical Corp	GR-1820-G5	A	9	Rad	G3	750	2100	15200	87	1210	1.61	6⅛x6⅞	1823.0	6.45	155	10.00	23⅜			54.25	47.75	.67	.025	prr	Al,S	Op	2M	So	Sg	Op	No	....	154					
						850	2100	6000			1.42				176	7.14																					
Wright Aeronautical Corp	GR-1820-G105A	A	9	Rad	G3	750	2300	18000	90	1275	1.7	6⅛x6⅞	1823.0	6.30	141	10.00	23⅜			55.10	48.12	.67	.025	prr	Al,S	Op	2M	So	Sg	Op	No	....	....					
						900	2300	6500			1.41				170	7.14																					
Wright Aeronautical Corp	GR-2600-A2	A	14	Rad-S	GI	1200	2100	5400	95	1875	1.56	6⅛x6 5/16	2603.0	6.85	174	7.4	23⅜			55.0	62.06	.65	.030	prr	Al,S	Op	2M	Sc	Hy	Op	No	2850	176					
Wright Aeronautical Corp	GR-2600-A2A	A	14	Rad-S	G6	1350	2300	5800	95	1935	1.43	6⅛x6 5/16	2603.0	6.85	178	7.0	23⅜			55.0	62.06	.73	.030	prr	Al,S	Op	2M	Sc	Hy,Sg	Op	No	2875	176					
Wright Aeronautical Corp	GR-2600-A5A	A	14	Rad-S	G6	1275	2300	12000	95	1950	1.53	6⅛x6 5/16	2603.0	6.85	168	10.00	23⅜			55.0	62.06	.80	.030	prr	Al,S	Op	2M	Sc	Hy,Sg	Op	No	2895	....					
						1350	2300	5000	.....	.....	1.45	.....	.....	.....	178	7.14						.73																
Wright Aeronautical Corp	GR-2600-A5B	A	14	Rad-S	G6	1350	2300	11500	90	1950	1.44	6⅛x6 5/16	2603.0	6.30	7.0	7.14 10:1	23⅜			55.5	62.06	.73	.030	prr	Al,S	Op	.....	Sc	Cg,Sg	Op	No	2895	....					

Abbreviations:
A —Air cooled
Al —Aluminum
Apl —Applied for
B —Bosch
Bat —Battery ignition
BG —B-G Corp. Spark plugs
C —Cast iron
Ch —Champion
Co —Coffman
D —Direct
DM —Dual magneto
Ec —Eclipse
ES —Edison Splitdorf
G —Geared
GI —3:2 reduction gear
G2 —4:3 reduction gear
G3 —16:11 reduction gear
G4 —7:5 reduction gear
G5 —2:1 reduction gear
H —Horizontal
Hy —Holley
Id —Inverted
L —Cylinders in line
Lh —"L" head
M —Magneto
NI —Nickel iron
Op —Optional
Opp —Opposed
ohc —Overhead cam
Pdg —Pending
prr —Push rods and rocker arms
Rad —Radial
Rad S—Staggered radial
S.L. —Sea Level
Sc —Scintilla
Sg —Stromberg
S —Steel
V —Vee
W —Liquid cooled
We —Welch
Z —Zenith

ENGINE FOOTNOTES
1 245 hp. at 220 r.p.m. for take-off.
2 Available with front or rear exhaust.
3 330 hp. at 2200 r.p.m. for take-off.
4 At take-off power.
5 Battery ignition optional.
6 Have one magneto and one battery.
7 Accessory drives, etc., meet U. S. Army specifications.
8 With Hub.
9 300 hp. at 2125 r.p.m. for take-off.
10 8½" Horizontal, 10⅝" vertical.
11 or B.G. spark plugs.
12 BMEP at rated power.

Aviation's Militar

AVIATION does not

Military

Manufacturer	Designation or Model No.	General: Type	General: Number of seats	Power Plant: Make of engine	Power Plant: Total rated h.p.	Power Plant: At altitude, ft.	Power Plant: Fuel capacity (gal.)	Power Plant: Normal range (mi.)	Power Plant: Fuel consumption at cruising speed (gal. per hr.)	Power Plant: Propeller diameter — (in.)	Performance: High speed (m.p.h.)	Performance: At altitude, ft.	Performance: Cruising speed (m.p.h.)	Performance: At altitude, ft.	Performance: Stalling speed (m.p.h.)	Performance: Climb at sea level (ft. per m.)	Performance: Service ceiling (ft.)
Beech Aircraft Corp	U. S. A. Air Corps YC-45	CBL	4	2Pwj	450	S.L.	.....	.....	.....	99	.....	.....	.....	.....	.....	.....	.....
Beech Aircraft Corp	Navy Bu. of Aero. GB-1	CBL	4	2Pwj	450	S.L.	.....	.....	.....	99	.....	.....	.....	.....	.....	.....	.....
Beech Aircraft Corp	JRB-1 Utility Transport	CML	5	2Pwj	900	S.L.	.....	.....	.....	99	.....	.....	.....	.....	.....	.....	.....
Beech Aircraft Corp	C-45 Personnel Transp.	CML	5–6	2Pwj	900	S.L.	.....	.....	.....	99	.....	.....	.....	.....	.....	.....	.....
Beech Aircraft Corp	F-2 Photographic Plane	CML	3	2Pwj	900	S.L.	.....	.....	.....	99	.....	.....	.....	.....	.....	.....	.....
Beech Aircraft Corp	AT18R Light Bomber	CML	3	2Wr,Ww	900	S.L.	.....	.....	.....	99	.....	.....	.....	.....	.....	.....	.....
Bell Aircraft Corp	P-39 Airacobra	CLM	1	ALN	1,090	15,000	140	1,560	56.6	124.5	.....	.....	.....	.....	.....	.....	.....
Bellanca Aircraft Corp	28–110	CML		Pwww	1,100	.....	.....	.....	.....	.....	291	.....	.....	.....	.....	.....	.....
Boeing Aircraft Co	B-299T Flying Fortress	CML	7–9	4Wr,Cy	4,800	S.L.	1,700	Over 3,000	.....	138	325	.....	.....	.....	70	2,260	36,700
Brewster Aeronautical Corp	138	CML	2	Wr,Cy	750	15,200	136	.....	.....	108	.....	.....	.....	.....	.....	.....	.....
Brewster Aeronautical Corp	239	CML	1	Wr,Cy	750	.....	.....	.....	.....	108	.....	.....	.....	.....	.....	.....	.....
Brewster Aeronautical Corp	339	CML	1	Wr,Cy	800	.....	160	.....	.....	123	.....	.....	.....	.....	.....	.....	.....
Brewster Aeronautical Corp	340	CML	2	Wr,Cy	1,500 1,350	S.L. 15,000	177	.....	.....	144	.....	.....	.....	.....	.....	.....	.....
Central Aircraft Corp	X-BAB-3 Attack Bomber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Consolidated Aircraft Corp	28 Military Amphibian	CMA	7	2Pwww	2,100	7,500	.....	3300	.....	.....	196	7,500 [14]	183	10,000 [15]	68	.....	17,000
Consolidated Aircraft Corp	28 Military Flying Boat	CMF	7	2Pwww	2,100	7,500	.....	3900	.....	.....	198	7,500 [14]	185	10,000 [15]	65	.....	19,000
Consolidated Aircraft Corp	32 Landplane Bomber	CML	9	4P&W	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crosby Aircraft Corp	CIP-5 [6]	.....	1	Ran,V12	.....	.....	.....	1,500	.....	.....	.....	15,000	.....	12,000	65	4,800	38,000
St. Louis Airplane, Div. Curtiss-Wright	21 Interceptor	CML	1	Wr,Cy	780	17,500	96	455	58.0	108	315	17,000	274	17,000	67	4,800	36,200
St. Louis Airplane, Div. Curtiss-Wright	Falcon 22	CML	2	WrWW	420	1,400	68	518	25.6	99	215	2,500	195	2,500	58	1,870	25,900
St. Louis Airplane Div., Curtiss-Wright	21-B Interceptor	CML	1	Wr,Cy	800 1,000	18,000 5,600	100	630	44.7	102	333 314	18,000 5,600	282	12,200	68	4,350	34,300
Curtiss Aeroplane Division, Buffalo, N. Y.	SO3C-1	CML	2	Ran,Id	520	.....	199	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Curtiss Aero. Division	Navy Scout SO3C-1	CMFL	2	Ran,Id	520	.....	199	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Curtiss Aero. Division	Helldiver-77	CBL	2	Cyy	950	[8]15,200	135	855	.....	.....	235	15,200	176	15,200	68	.....	24,500
Curtiss Aero. Division	P-40	CML	1	Aln	1,000	15,000	120	945	.....	.....	.....	.....	.....	.....	.....	.....	.....
Curtiss Aero. Division	Hawk 81-A	CML	1	Aln	1,090	[8]15,000	160	893	.....	.....	.....	.....	.....	.....	.....	.....	.....
Curtiss Aero. Division	H75-A	CML	1	Wr	1,000	15,000	163	1,003	.....	.....	323	[8]15,000	262	15,000	69	.....	32,700
Douglas Aircraft Co., Inc	B-19 Super Bomber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas Aircraft Co., Inc	DB-7 H-W Att. Bomber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas Aircraft Co., Inc	DB-7B H-W Att Bomber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas Aircraft Co., Inc	A-20 High W Att Bomber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas Aircraft Co., Inc	A-20 High W Att Bomber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas Aircraft Co., Inc	C-47 Troop Transport	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas Aircraft Co., Inc	SBD-1, -2, -3 Dive Bomb.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas Aircraft Co., Inc	8A-5 Low W Att Bomber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas Aircraft Co., Inc	A-20A H W Att Bomber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fleetwings, Inc	XBT-12 Basic Trainer	CML	2	Pwj	.....	.....	120	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fletcher Aviation Corp	FBT-2 [16]	LM	2	Wr	285	S.L.	50	540	14	7'10"	175	S.L.	[17] 150	S.L.	60	1,340	19,000
Grumman Aircraft Engineering Corp	Utility J2F-1	CBA	2–4	Wr,Cy	775	5,800	190	780	37.5	108	180	7,000	150	7,000	64	1,500	21,000
Grumman Aircraft Engineering Corp	G-21B	CMA	8	2Pwj,Ri	800	5,000	220	800	51.0	102	201	5,000	190	9,600	62	1,300	22,000
Grumman Aircraft Engineering Corp	G-36A Fighter	CML	1	Wr,Cy	1,200	Take-off	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grumman Aircraft Engineering Corp	JRF-2 [1] (CG)	CMA	...	Pwj,Ri	800	5,000	220	1,000	.....	102	200	5,000	190	9,600	65	1,300	22,000
Grumman Aircraft Engineering Corp	F4F-3, Fighter	CML	1	Pwww	1,200	Take-off	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harlow Aircraft	PC-5	CLM	2	Warner	145	S.L.	34	500	9.5	84	145	S.L.	140	S.L.	52	680	12,700
Kellett Autogiro Corp	KD-1A	OLGY	2	Ja	225	S.L.	30	205	14.0	102	125	S.L.	100	S.L.	No	1,060	14,000
Glenn L. Martin Co	167-W	CML	3	2Pwww	2,100	7,100	760	2,470	.....	132	310	14,000	248	.....	69	1,790	31,500
Glenn L. Martin Co	162 (PBM-1)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glenn L. Martin Co	B-26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North American Aviation, Inc	NA-16-3	CML	2	Pww	550	5,000	111	730	23.5	108	206	5,000	180	12,000	66	1,350	23,000
North American Aviation, Inc	NA-40A	CML	5	Wr,Cy	2,500	12,000	916	1,728	133	180	308	13,000	259	10,500	85	1,880	25,400
North American Aviation, Inc	NA-73	CML	1	Aln	960	12,000	105	640	48.3	126	.....	.....	.....	.....	.....	.....	.....
Northrop Aircraft, Inc	N-3PB	.....	3	Wright G-200	1,200	S.L.	320	1,165	38½	126	217	16,400	150	5,000	65	1,280	24,000
Northrop Aircraft, Inc	N-3	.....	3	Pw R-2,800	2,000	Tk-off S.L.	150	600	52½	138	330	14,000	215	7,500	68	3,000	36,500
Northrop Aircraft, Inc	N-3	.....	3	Wright G-200	1,200	Tk-off S.L.	175	785	38½	126	262	16,400	172	5,000	65	1,725	26,000
Phillips Aviation Co	X-PT	CML	2	Ranger	165	Tk-off S.L.	38	.....	10.5	92	158	S.L.	139	5,000	46	920	17,400
Republic Aviation Corp	U S Army Air Corps P35	CML	1	Pwww,Ri	850	8,000	160	.....	.....	10'6"	.....	.....	.....	.....	.....	.....	.....
Republic Aviation Corp	2PA-A Model 230	CMA	2	Wr,Cy,Ri	850	5,800	20 20	130	.....	9'0"	225	5,800	.....	.....	.....	.....	.....
Republic Aviation Corp	EP-1 Model 106 U S A AC P-35A	CML	1	Pwww,Ri	1,050	11,500	200	600	.....	10'6"	305	12,000	260	15,300	83	2,800	30,000
Republic Aviation Corp	2 PA Model 204 USA ACAT-12	CML	2	Pwww,Ri	1,050	11,500	[15] 200	580	.....	10'6"	293	11,500	250	15,000	86	2,050	28,000
Republic Aviation Corp	Lancer USA AC YP-43	CML	1	Pwww,Ri	1,200	23,000	[11] 145	520	.....	11'0"	375	23,000	325	23,000	86	3,380	.....
Ryan Aeronautical Co	STM-S2	OMFL	2	Men	150	3,000	24	246	10.0	80	122	S.L.	108	S.L.	59	700	12,250
Ryan Aeronautical Co	ST-3	OML	2	Kin	125	S.L.	24	312	.....	90	120	S.L.	109	.....	56.4	635	12,800
Ryan Aeronautical Co	ST-3	OML	2	Kin	160	S.L.	24	266	.....	90	129	S.L.	120	.....	57	850	15,800
Ryan Aeronautical Co	ST-3	OML	2	Men	125	S.L.	24	345	.....	87	126	S.L.	115	.....	56.4	620	12,900
Ryan Aeronautical Co	ST-3	OML	2	Men	150	3,000	24	309	.....	87	136	S.L.	122	.....	57	830	18,000
Stearman Aircraft Co. [21]	76D1	OLB	2	Pwj	320	S.L.	70	540	.....	105	151	S.L.	132	S.L.	56	1,060	18,400
Stearman Aircraft Co. [21]	76C3	OLB	2	Wr,Ww	420	1,400	100	550	.....	105	156	S.L.	136	S.L.	59	1,220	20,000
Stearman Aircraft Co. [21]	76D3	OLB	...	Pwj,Ri	400	5,000	100	635	.....	105	157	5,000	135	5,000	56	1,410	23,600
Stearman Aircraft Co. [21]	S76D1	OSB	...	Pwj	320	S.L.	70	478	.....	105	135	S.L.	118	S.L.	58	840	15,000
Stearman Aircraft Co. [22]	A75L3	OLB	2	Ly	225	S.L.	46	386	.....	102	125	S.L.	103	S.L.	51	825	13,200
Vought-Sikorsky Div., United Aircraft	V-142	CBL	2	Pwwj	750	8,900	145	.....	.....	120	208	9,000	172	9,000	65	1,330	24,200
Vought-Sikorsky Div., United Aircraft	V-156	CML	2	Pwwj	750	9,000	130	701	30.3	132	257	11,000	227	10,000	60	1,545	28,200
Vought-Sikorsky Div., United Aircraft	OS2U-1 [23]	CM [24]	2	Pwj	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vought-Sikorsky Div., United Aircraft	XSO2U-1 [23]	CM [24]	2	Ran	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vought-Sikorsky Div., United Aircraft	XPBS-1	CMF	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vultee Aircraft, Inc	V-12C	CML	3	Wr,Cy	.....	.....	250	1,350	.....	.....	242	8,500	226	15,500	.....	.....	25,200
Vultee Aircraft, Inc	V-12D	CML	3	Wr,Cy	.....	.....	350	1,050	.....	.....	264	6,000	248	12,000	.....	.....	28,800
Vultee Aircraft, Inc	Vanguard P-48	CML	1	Pwww	1,200	4,900	240	700	.....	.....	340	6,900	290	16,000	.....	.....	33,000
Vultee Aircraft, Inc	Valiant 54	CML	2	Pwj	450	S.L.	92	730	.....	.....	182	S.L.	170	5,000	.....	.....	21,000
Vultee Aircraft, Inc	Observation Vigilant-74	CML	2	Ly	290	S.L.	47	.....	.....	.....	133	S.L.	121	S.L.	31	1,160	20,000
Waco Aircraft Co	S2HD	CBL	2	Pwj,Ri	400	5,000	.....	.....	.....	.....	175	S.L.	158	.....	.....	.....	.....
Waco Aircraft Co	WHD	CBL	2	Wr,Ri	420	1,400	.....	.....	.....	.....	180	S.L.	162	.....	.....	.....	.....
Waco Aircraft Co	LPF-7	CBL	2	Ly,Ri	220	S.L.	50	320	12.5	.....	135	S.L.	105	S.L.	51	868	14,600

[1] Has camera hatch in hull bottom for aerial mapping. Complete set of flight and engine instruments. Provision for installation of deicing equipment. Accessories as in G-21A.

[2] Main landing gear, smooth contour; nose wheel 19 in.

[3] Steerable and swivelable.

[4] Plastic.

[5] Full retracting electric.

[6] Six machine guns, self-sealing tanks; all additional information is restricted.

[7] First 35% of wing, spot welding.

[8] Critical altitude.

[9] Main float and two wing flo

[10] Front section tubular steel metal panels; rear section alumi semi-monocoque.

[11] Total capacity, including " fuel — 190 gallons.

litary Aircraft Specifications

ON does not assume responsibility for the figures given

			Weights				Dimensions			Area — (Sq. Ft.)						Wings		
(m.p.h.)	Climb at sea level (ft. per m.)	Service ceiling (ft.)	Wing loading (lb. per sq. ft.)	Power loading (lb. per h.p.)	Weight empty	Gross weight (lb.)	Span	Length overall	Height overall	Wing (including ailerons)	Ailerons (total)	Fin	Rudder	Stabilizer	Elevators (total)	Spars	Ribs	Covering material
							32′	25′11-1/16″	8′	296.5								
							32′	25′11-1/16″	8′	296.5								
							47′8″	34′3″		347								
							47′8″	34′3″	8′	347								
							47′8″	34′3″	8′	347								
							47′8″	34′3″	8′	347								
			31.03	6.07	4,955	6,662	34′	29′9″	9′2.75″	213	15.04	9.81	10.22	24.22	17.34	Me	Me	Str. Skin
					4,775	8,454												
70	2,260	36,700	33.5	11.88	31,160	47,500	103′9-3/8″	67′10-1/16″	15′4-1/2″							D	D	AD
							39′	27′10″	10′11″							S.M.B.	Al, Tr	Al, Fab
							35′	26′1-1/2″	12′							S.M.B.	Al, Tr	Al
							35′	25′7-3/4″	12′							S.M.B.	Al, Tr	Al
							47′	39-1/4′	15-1/4′							S.M.B.	Al, Tr	Al
68		17,000	22.8	13.3		32,000	104′	65′2″	19′9″	1,400	100[18]	60.8	50	119.8	85.0	D, Rv	D	D, Fab
65		19,000	21.5	12.5		30,100	104′	65′2″	19′9″	1,400	100[18]	60.8	50	119.8	85.0	D, Rv	D	D, Fab
						47,000	110′	63′4″	17′11″									
65	4,800	38,000	23.3	4.3												Ply	4	Pl, Lmd
67	4,800	36,200	25.2	4.75	3,189	4,180	35′	26′4″	8′8″	174.3	11.90	8.06	7.36	16.98	8.58	AD	AD	AD
58	1,870	25,900	18.4	7.62	2,307	3,200	35′	26′6″	7′6″	174.3	11.90	8.06	7.36	16.98	8.58	AD	AD	AD
68	4,350	34,300	25.8	4.5	3,382	4,500	35′	26′4″	8′8″	174.3	11.90	8.06	7.36	16.98	8.58	AD	AD	AD
			19.25	10.7	4,113	5,588	38′	34′2″	11′4″	290		13.9	13.1	33.2	28.0	Me	Me	AD
			19.7	12.7	4,284	5,729	38′	36′9″	15′	290		13.9	13.1	33.2	28.0	Me	Me	AD
68		24,500	19.7	6.6	4,548	6,256	34′	27′5″	10′4″	317		10.5	12.5	34.4	24.9	Me	Me	AD
			28.6	6.8	5,381	6,789	37.3′	31.7′	10.6′	236		7.0	13.7	28.8	19.2	Me	Me	AD
			29.6	6.4	5,475	6,978	37.3′	31.7′	10.6′	236		7.0	13.7	28.8	19.2	Me	Me	AD
69		32,700	24.3	4.8	4,541	5,731	37.3′	28.8′	9.5′	236		7.0	13.7	28.8	19.2	Me	Me	AD
							40′	29′2″	10′4″							SS	SS	SS, Fab[7]
60	1,340	19,000	20.0	8.75	1,740	2,500	30′	23.2′	8.1′	125	11.4	8.9	4.1	17.8	8.2	Sp	Sp	Ply
64	1,500	21,000	15.1	8.0	4,300	6,120	39′	34′	12′4″	409	32.0	14.2	10.6	32.1	24.6	D	D	Fab
62	1,300	22,000	21.3	8.9	5,425	8,000	49′	38′4″	12′	375.0	22.5	26.7	21.0	44.8	31.2	D, Box	D	Me
							38′	28′10″	9′2-1/2″	260[8]	11.48	13.2	9.38	30.43	18.6	D	D	Me
65	1,300	22,000	21.3	8.9	5,530	7,955	49′	38′4″	12′	375.0	22.5	26.7	21.0	44.8	31.2	D, Box	D	Me
52	680	12,700	14.05	17.94	1,790	2,400	35′9-3/4″	23′4″	7′8″	185.0	13.02	12.58	10.9	21.2	17.12	D	Me	D
	1,060	14,000	40.6[18]	9.98	1,600	2,245	40′	28′10″	10′3″	55.21[9]		12.0	3.2	22.0		ST	Ply	Pl, Fab
69	1,790	31,500	28.4	8.5	10,586	15,297	61′4″	46′8″	10′	538.5	47.5	18.87	23.89	73.56	42.6	D	D	D
66	1,350	23,000	20.73	9.56	3,958	5,260	42′1-1/4″	28′11-1/16″	8′9″	253.73	22.80	5.33	13.21	28.34	21.76	D	D	AD
85	1,880	25,400	39.33	7.50	16,000	24,000	67′6″	51′5″	14′10-1/2″	610.1	32.3	40.8	35.6	92.0	46.0	D	D	AD
			32.6	7.34	5,990	7,708	37′-1/4″	32′2-5/8″	104″	235.95	16.6	10.07	10.80	28.04	16.46	D	D	AD
65	1,280	24,000	22-1/4	8.95	6,151	8,500	48′11″	38′	16′10″	377	24	12.7	25.4	35.6	34.4	AD	AD	AD
68	3,000	36,500	22-1/2	5.67	6,566	9,630	48′11″	35′	10′2″	377	24	12.7	25.4	35.6	34.4	AD	AD	AD
65	1,725	26,000	22-1/2	8.95	5,477	8,500	48′11″	35′	10′2″	377	24	12.7	25.4	35.6	34.4	AD	AD	AD
46	920	17,400	.....	.....	1,690	2,500	36′2″	23′6″	7′8″	195	.....	.....	.....	.....	.....	AD	AD	AD
			25.2	6.5	4,279	5,563	36′	25′4″	9′9-1/2″	220.0	19.3	10.0	9.5	18.9	16.2	D	D	AD
			26.0	7.65		6,500	41′	30′4″	14′4″	250.0	22.0	11.1	10.2	23.3	20.7	D	D	AD
83	2,800	30,000	27.1	5.76	4,708	6,053	36′	26′10″	9′9-1/2″	220.0	19.6	9.96	7.96	18.9	16.2	D	D	AD
86	2,050	28,000	30.0	7.12	5,146	7,480	41′	27′8″	9′9-1/2″	250.0	22.0	10.17	9.61	23.4	20.9	D	D	AD
86	3,380	.....	32.1	5.96	5,478	7,155	36′	28′5-3/4″	10′2-1/16″	223.7	19.5	10.1	9.5	19.2	15.9	D	D	AD
59	700	12,250	14.7	12.2	1,311	1,828	29′11″	22′8-1/2″	7′4-1/2″	124.0	12.0	4.7	7.2	12.0	10.0	Sol, Sp	D	Fab
.4	635	12,800	13.2	14.2	1,228	1,775	30′1″	22′5″	7′2″	134.3	11.12	4.64	7.75	14.48	11.0	Sol, Sp	D	Fab
57	850	15,800	13.6	11.4	1,272	1,825	30′1″	22′5″	7′2″	134.3	.....	.....	.....	.....	.....	Sol, Sp	D	Fab
.4	620	12,900	13.2	14.2	1,230	1,775	30′1″	23′3″	6′10″	134.3	.....	.....	.....	.....	.....	Sol, Sp	D	Fab
57	830	18,000	13.6	12.2	1,240	1,825	30′1″	23′3″	6′10″	134.3	.....	.....	.....	.....	.....	Sol, Sp	D	Fab
56	1,060	18,400	10.9	10.1	2,371	3,240	32′2″	24′5″	9′2″	297.4	18.74	3.14	11.83	21.5	14.14	Sol, Sp	Sp	Fab
59	1,220	20,000	11.9	8.4	2,561	3,530	32′2″	24′3″	9′2″	297.4	18.74	3.14	11.83	21.5	14.14	Sol, Sp	Sp	Fab
56	1,410	23,600	10.92	8.125	2,435	3,250	32′2″	25′1-1/4″	9′2″	297.4	18.74	3.14	11.83	21.5	14.14	Sol, Sp	Sp	Fab
58	840	15,000	11.87	11.0	2,459	3,533	32′2″	27′9-1/16″	11′3″	297.4	18.74	3.14	11.83	21.5	14.14	Sol, Sp	Sp	Fab
51	825	13,200	9.02	11.9	1,977	2,686	32′2″	24′9-1/2″	9′4-1/2″	297.6	23.78	3.14	11.83	21.16	14.14	Sol, Sp	Sp	Fab
65	1,330	24,200	16.68	7.28	3,550	5,445	33′3″	27′9-1/4″	10′	327.0	26.5	6.74	13.35	26.6	18.18	D, I	D	Fab
60	1,545	28,200	21.3	8.7	4,500	6,500	42′	33′11-1/4″	9′9-1/2″	305.3	27.6	10.62	11.45	23.72	16.44	D, SM, B	D	D, Fab
		25,200			6,480	9,975	50′0″	38.2′	12′11″	384.0	.....							
		28,800			7,268	10,425	50′0″	38.2′	12′11″	384.0	.....							
		33,000			4,841	6,182	36′0″	28′0″	9′5″	197.0	.....							
		21,000			2,976	3,991	42′0″	28′7″	9′1″	239.0	.....							
31	1,160	20,000			2,591	3,322	50′10-1/2″	33′6-1/2″	9′10″							All Me		Fab
			14.25	9.47		3,800	32′8-5/8″	25′6-1/2″		256.3	.....	.....	.....	.....	.....	Sp	Sp	Fab
			14.25	9.02		3,800	32′8-5/8″	25′6-1/2″		256.3	.....	.....	.....	.....	.....	Sp	Sp	Fab
51	868	14,600	10.85	12.06	2,593	2,650	30′	23′1″	8′6″	243.6	.....	.....	.....	.....	.....	Sp	Sp	Fab

Military Aircraft Footnotes

ltitude.
t and two wing floats.
ction tubular steel frame and
rear section aluminum alloy
que.
pacity, including "overload"
allons.

[12] Total capacity, including "overload" fuel — 340 gallons.
[13] Cleveland Pneumatic Tool Co.
[14] At 75% rated power.
[15] For gross weight less 1/5 fuel, power off.
[16] This airplane will accommodate 16 models of engines made by 6 American engine manufacturers [130 hp. (F A-460 7-cyl. Radial) to 285 hp.]
[17] 65% power.
[18] Blade loading.
[19] Blade area.
[20] Fuel load up to 350 gallons ava
[21] Available in range 320–420 hp

on's Military Aircraft Specifications

AVIATION does not assume responsibility for the figures given

Performance								Weights				Dimensions			Area — (Sq. Ft.)						Wings			Landing Gear					
Propeller diameter — (in.)	High speed (m.p.h.)	At altitude, ft.	Cruising speed (m.p.h.)	At altitude, ft.	Stalling speed (m.p.h.)	Climb at sea level (ft. per m.)	Service ceiling (ft.)	Wing loading (lb. per sq. ft.)	Power loading (lb. per h.p.)	Weight empty	Gross weight (lb.)	Span	Length overall	Height overall	Wing (including ailerons)	Ailerons (total)	Fin	Rudder	Stabilizer	Elevators (total)	Spars	Ribs	Covering material	Type	Tread (in.)	Wheel type and size	Brakes (type and make)	Landing gear shock unit (type and make)	Tail unit
99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32′	25′11 1/16″	8′	296.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32′	25′11 1/16″	8′	296.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47′8″	34′3″	.....	347	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47′8″	34′3″	8′

ar			
Landing gear shock unit (type and make)	Tail unit	Fuselage or Hull †
Ol		Mo
Ol,Pn	RW	D,Rv,AD
Ol,Pn		Mo
Ol,Pn		Mo
Ol,Pn		Mo
Ol,Pn		Mo
Oleo		D,Rv,Mo
		D,Rv,Mo
		Ply,Lmd
Ol,Pn	Wh	D,Rv,AD
Ol,Pn	Wh	D,Rv,AD
Ol,Pn	Wh	D,Rv,AD
Curt,Ol	Wh	Mo,AD
		Mo,AD
Curt,Ol	Wh	Mo,AD
Curt,Ol	Wh	Mo,AD
Curt,Ol	Wh	Mo,AD
Curt,Ol	Wh	Mo,AD
	SS,Wh	SS
Air-,Ol	Wh	Mo,Ply
Bx,Ol	Wh	D,Mo
Bx,Ol	Wh	D,Mo
Bx,Ol	Wh	D,Mo
Bx,Ol	Wh	D,Mo
Acp,Ol	Wh	Ad,Rv
Ol,Bx	Wh	ST,Wl,Fab
Ol	Wh	D,Rv
Aer	Wh	(50)
Aer	Sk	D,Mo,AD
Aer	Wh	D,Mo,AD
Ol	Wh	
Ol	Wh	
Air,Ki	Pn	Stiff Skin
Ol	Ol	
Ol	Re	
Ol,Pn	Re	D & AD
Ol,Pn	Re	D & AD
Ol,Pn	Re	D & AD
		D,Mo
Ol	Wh	D,Mo
Ol	Wh	D,Mo
Ol	Wh	D,Mo
Ol	Wh	D,Mo
Ol	Wh	ST,Wl,Fab
Ol	Wh	ST,Wl,Fab
Ol	Wh	ST,Wl,Fab
		ST,Wl,Fab
Ol	Wh	ST,Wl,Fab
Ol	Wh	ST,Wl,Fab
Ol	Wh	ST,Wl,Fab
		Me,SemiMo
		Me,SemiMo
		Wl,ST, SemiMo
		Wl,ST, SemiMo
		Wl,ST,Fab
Waco,Ol	Wh	
Waco,Ol	Wh	
Waco,Ol	Wh	

Key to Abbreviations

•	—Approved on floats
A	—Amphibian
Acp	—Aircraft Prod
AD	—Alclad
Aer	—Aerol
Al	—Aluminum
Aln	—Allison
Apl	—Applied for
Ar-	—Aeronca
Aut	—Autofan
Aw	—Air Wheels
B	—Biplane
Bo	—Bolted
Box	—Box spar
Bx	—Bendix
C	—Closed
CG	—Coast Guard
Con	—Continental
Crit	—Critical
Cy	—Cyclone
Cyy	—Two row Cyclone
D	—Aluminum Alloy
E.H.	—Ebert Hatch
F	—Flying Boat
Fab	—Fabric
Fl	—Floats
Fo	—Ford
Fr	—Franklin
Fx	—Fixed
G	—Glued
Gen	—General
Go	—Goodyear
Gr	—Goodrich
Gy	—Autogiro
Ha	—Hayes
Yyd	—Hydraulic
I	—"I" section
Id	—Inverted
Ja	—Jacobs
K	—Kinner
Kr	—Ken Royce
L	—Landplane
Lam	—Lambert
LeB	—LeBlond
Len	—Lenape
Lmd	—Laminated
Lp	—Low Pressure
Ly	—Lycoming
M	—Monoplane
Me	—Metal
Mech	—Mechanical
Men	—Menasco
Mil	—Military
Mo	—Monocoque
Mu	—Multicellular
O	—Open
Ol	—Oleo
Op	—Optional
Pal	—Palmer
Ply	—Plywood
Pn	—Pneumatic
Pob	—Pobjoy
Pwn	—P & W Hornet
Pwj	—P & W Wasp, Jr.
Pwwj	—P & W Twin Wasp, Jr.
Pww	—P & W Wasp
Pwww	—P & W Twin Wasp
Q	—Sesquiplane
Ran	—Ranger
Re	—Retractable
Ri	—Lord Instrument Mounting
Rm	—Lord Engine Mounting
RW	—Retractable Wheel
Ro	—Routed
Ru	—Rusco
Rv	—Riveted
S	—Steel
Sc	—Shock cord
Se	—Security
Sk	—Skid
Sl	—Streamline
S.L.	—Sea Level
Sh	—Shinn
S.M.B.	—Single metal box
Sol	—Solid
Sp	—Spruce
Spr	—Spring
SS	—Stainless Steel
Stu	—Studebaker
Sa	—Szekly
T	—Tubing
Trs	—Truss
Ty	—Tricycle
W	—Wood
War	—Warner
Wel	—Welch
Wh	—Wheel
Wl	—Welded
Wr	—Wright
Ww	—Whirlwind

ilitary equipment which may
ghts and performance.
ble in range 225–320 hp., not
ith radio, armament, provisions
aphic equipment.
Model.
rtible.

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Model "CHTF"—Light-duty fork truck designed expressly for light unit load operation. Capacities 1000 and 2000 lbs. Has full telescopic fork lift 120"—Collapsed height 83". Exceptionally compact for box car operation and narrow platform or aisle maneuvering.

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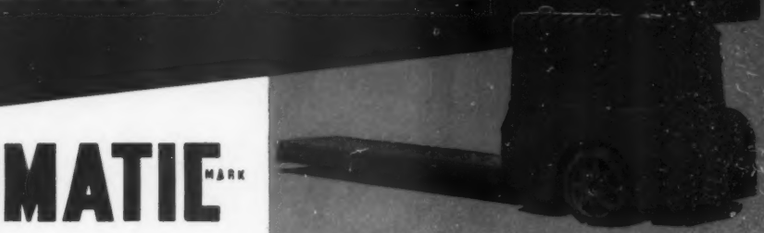
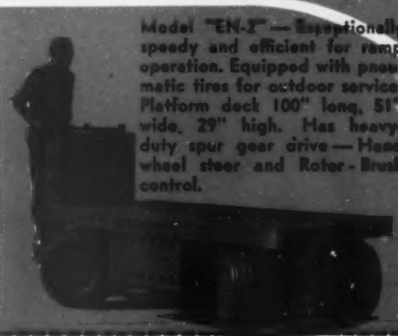


Model "LO-5"—For heavy-duty top-performance and efficiency to handle 10,000-lb. skid loads. Has standard platform 60" long, 26" wide, 11" high with 5" lift. Speed-O-Matic Drive control, Equa-poised drive and Dynatrol lift units.

Model "LN-3"—For speedy transportation and placing of 6000-lb. skid loads. Has standard platform 55" long, 27" wide, 10¾" high with 6" lift—Spur gear, drive and lift units—Roter-Brush control system.

Model "TLN-3"—For 6000-lb. skidloads tiering plus transportation. Has standard platform 55" long, 27" wide, 10¾" high, 60" lift.

Model "TLO-5"—For heavy duty transportation plus tiering of 10,000-lb. capacity skid loads. Has standard platform 60" long, 26¼" wide, 11" high with 60" lift. The very latest in electrical control—construction styling and performance efficiency.



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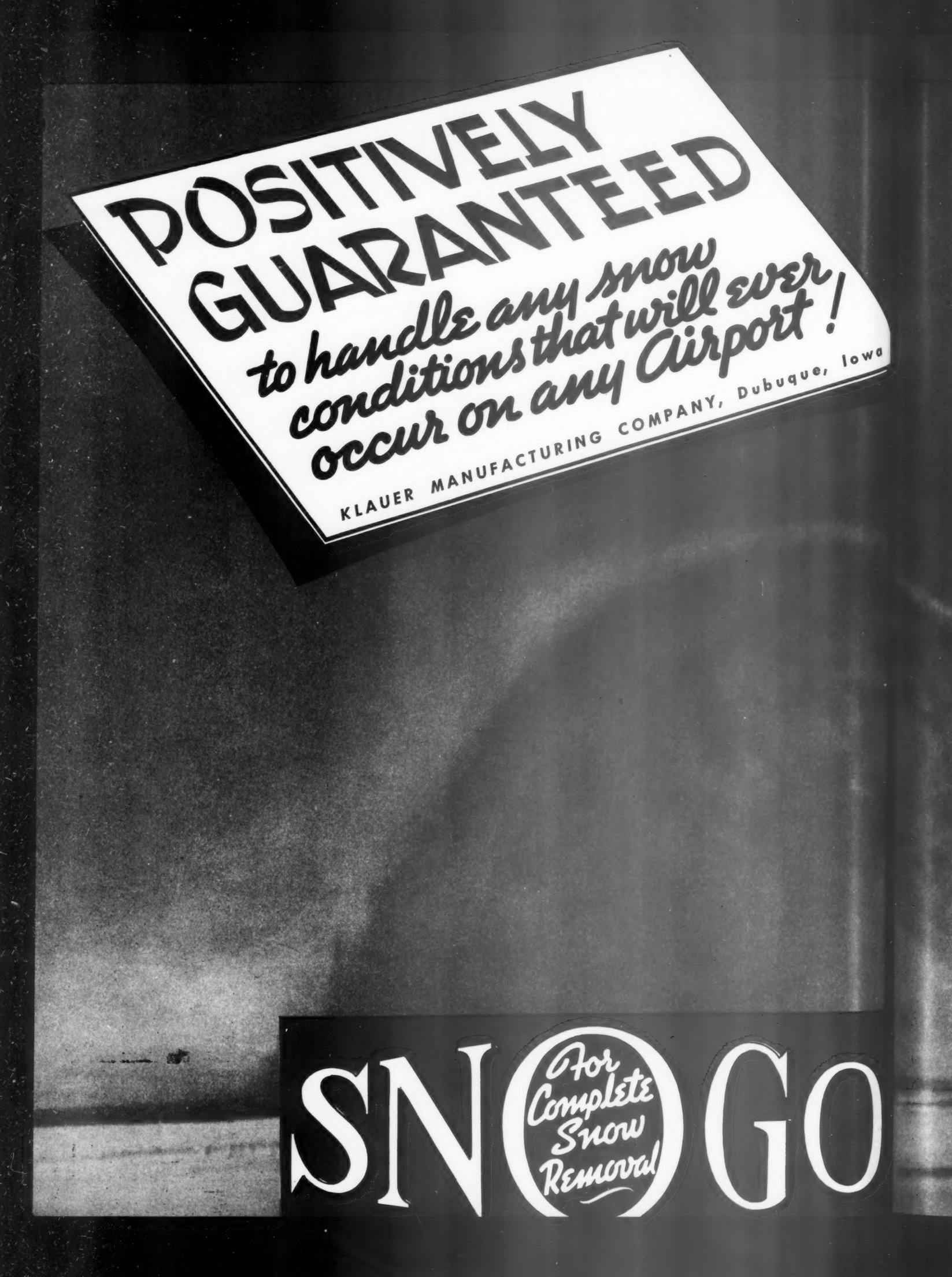
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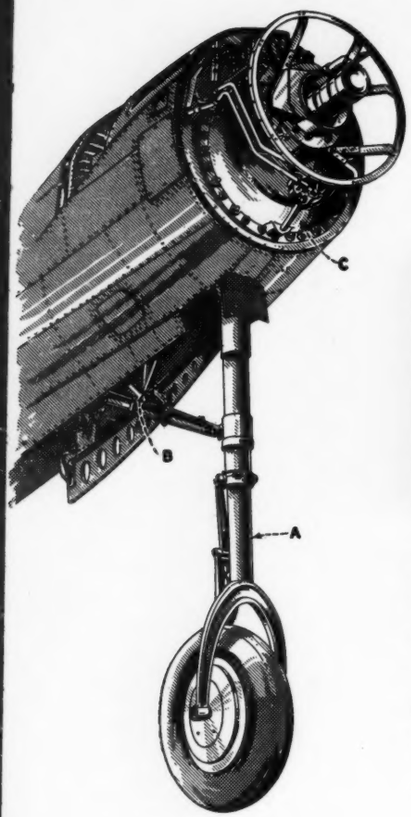
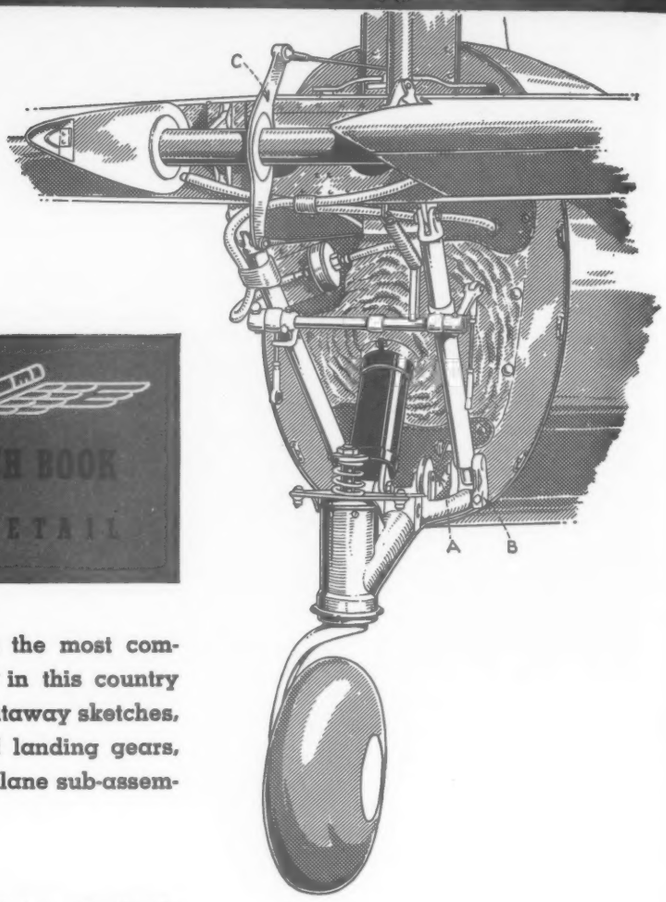




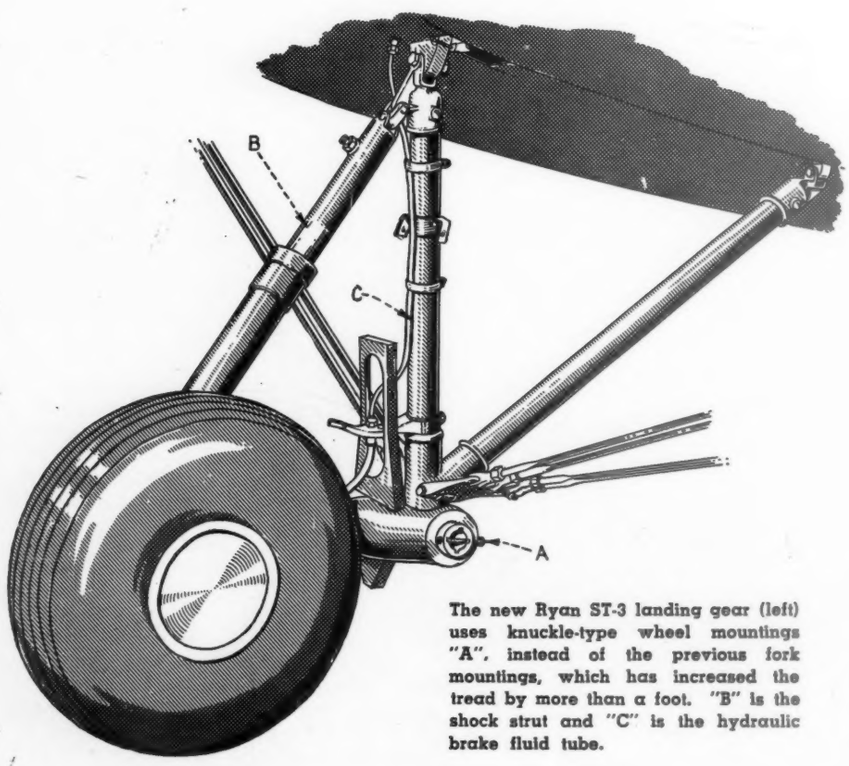
AVIATION SKETCH BOOK OF DESIGN DETAIL

AVIATION once again offers the most complete presentation of its kind in this country of perspective drawings and cutaway sketches, including structural details, of landing gears, fuselages, armaments and airplane sub-assemblies.

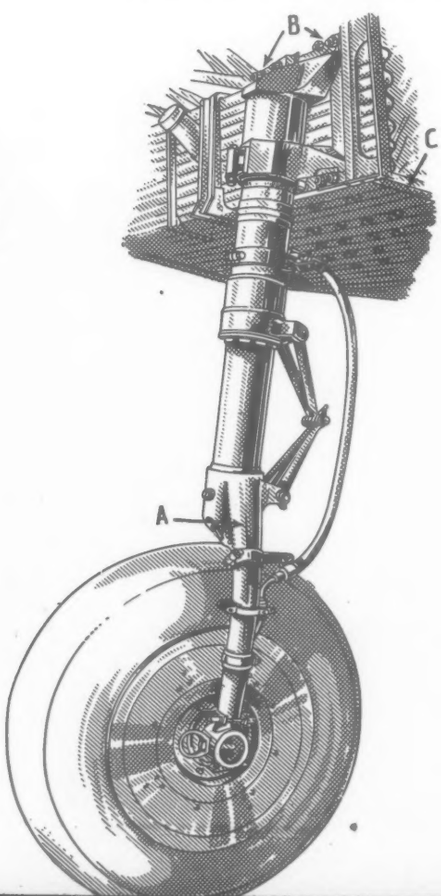
The nose wheel (above) of the Bell P-39 Airacobra is mounted far forward in the ship. The shock is taken by the Oleo at "A" with the torque scissors connected to the top and bottom of this section. Retraction is made by the mechanism at "B". "C" is the gear transmission housing where the drive shaft from engine comes in at the bottom so that propeller shaft is in the center of the ship.

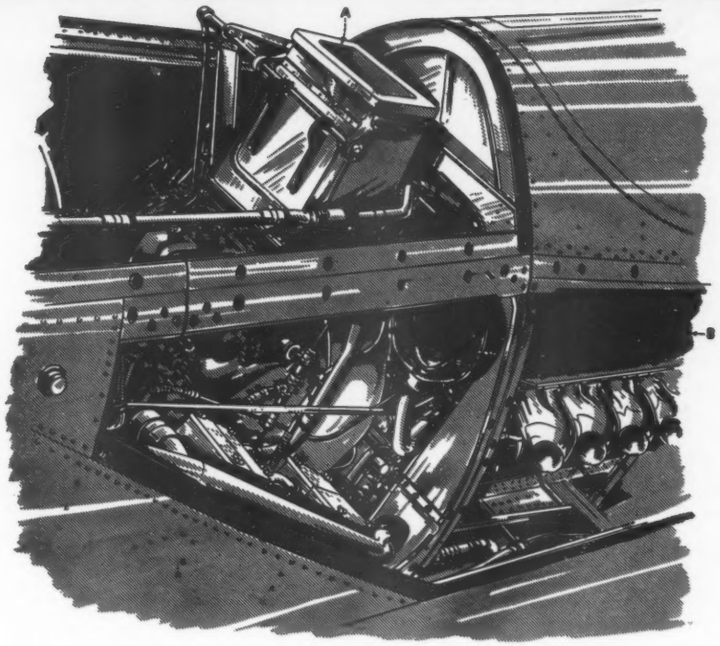
The tail wheel unit (left) of the Vought-Sikorsky V-143 is of the fully retractable type, hinged at "B", mounting a 10½ in. streamlined tire. The wheel is steerable through range of rudder movement by "A", but is automatically released at greater angular movements so that it will swivel freely throughout the remainder of 360 deg. An anti-vibration device is incorporated in the swivel mechanism. "C" is the elevator control.

The landing gear (below) of the Fleetwings Trainer Model XBT-12 is mounted to the main wing spar by four sets of two bolts each, "B". The shock strut is attached to the axle through the large steel fitting at "A". "C" is where the outer wing panel is joined to the center section.

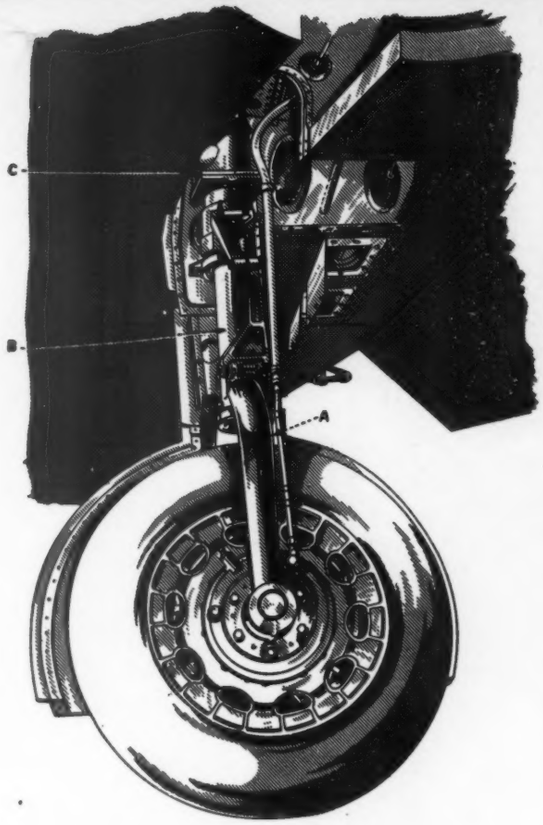


The new Ryan ST-3 landing gear (left) uses knuckle-type wheel mountings "A", instead of the previous fork mountings, which has increased the tread by more than a foot. "B" is the shock strut and "C" is the hydraulic brake fluid tube.

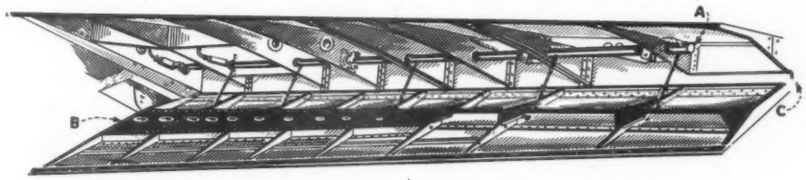




The Allison engine installation in the Bell P-39 Airacobra (above) mounts the air intake to the carburetor and supercharger at "A". The ship is so compact that there is but a small clearance between the cylinder heads and the outer section at "B".

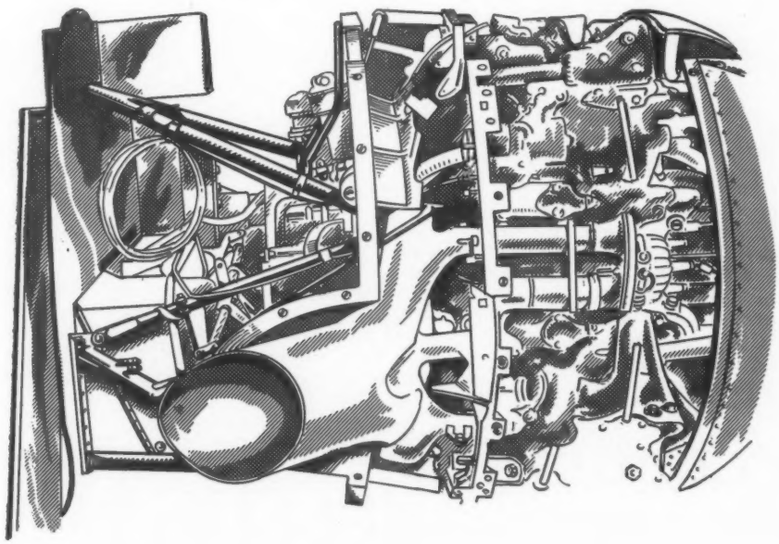


The landing gear of the Airacobra (above) takes the main load through the arm at "A" and the shock at "B". It is hinged just above point "C" and the wheels fold inward towards the center of the ship.

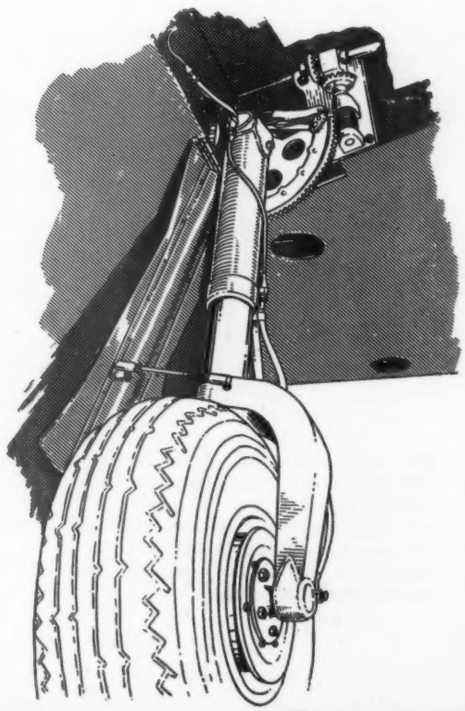


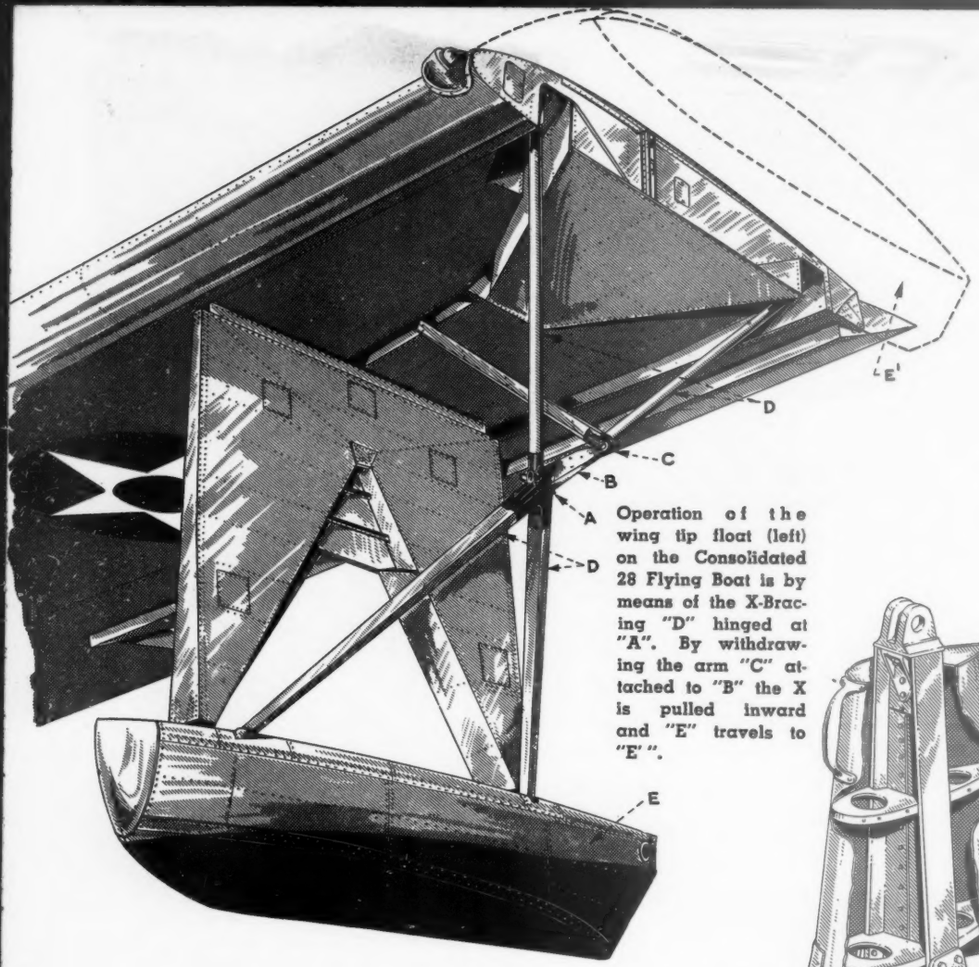
The wing flaps on the Airacobra are operated by means of the torque tube at "A". The flap has one center main spar at "B" with a piano hinge at "C".

The engine mount (below) of the Vought-Sikorsky V-143 consists of a welded chrome-molybdenum steel tube framework attached to the fuselage forward main frame at three points, and to an auxiliary supporting structure at two points. This auxiliary structure, which is also of welded chrome-molybdenum tubing, is in turn attached to the fuselage forward main frame at five points.

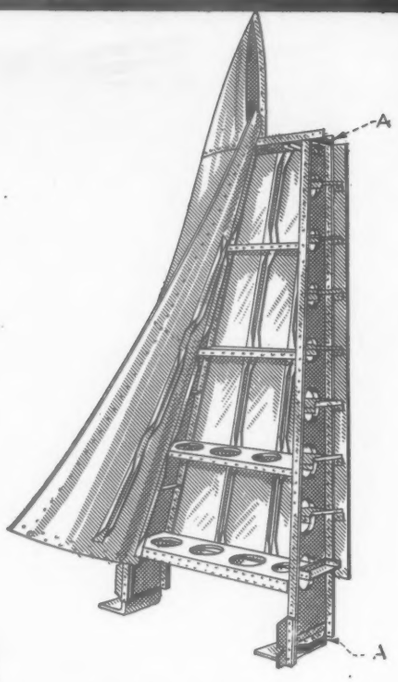


The landing gear of the Summit Model HM-5 (below) is retracted by means of the worm and quadrant gear. The worm is hand operated by the torque tube from the fuselage and an ingenious shock cord counter balance relieves any load from the pilot.

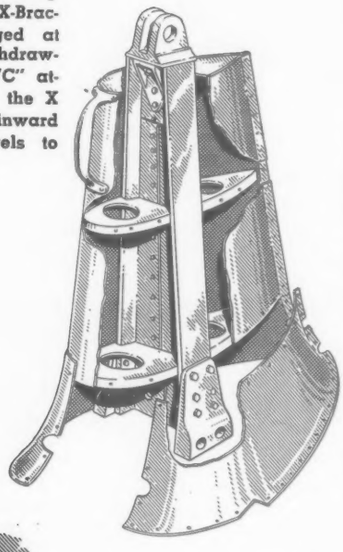




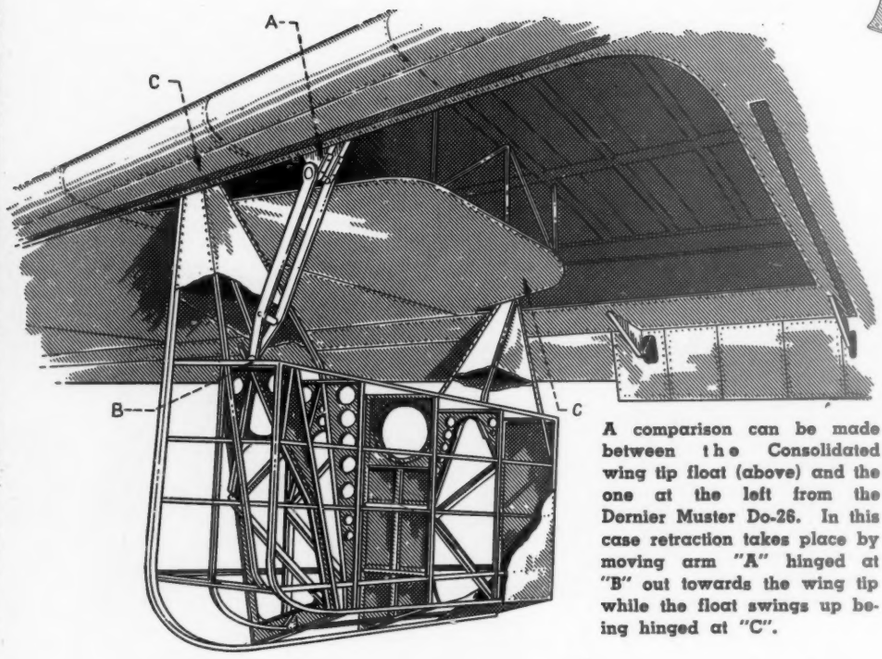
Operation of the wing tip float (left) on the Consolidated 28 Flying Boat is by means of the X-Bracing "D" hinged at "A". By withdrawing the arm "C" attached to "B" the X is pulled inward and "E" travels to "E' ".



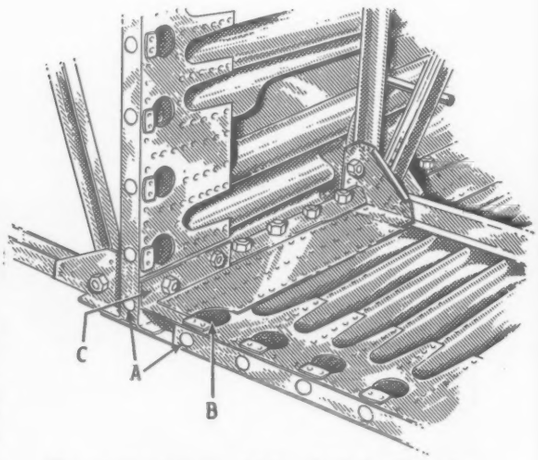
The fin of the Vought-Sikorsky V-143 (above) is of cantilever construction rigidly fixed to fuselage. It is of metal beam and rib construction with metal covering. The hinge line for the rudder is along "A", and the upper portion of the fin above the top letter "A" is removable.



The Navy float No. 68 utilizes the strut at the left in its attachment to the fuselage. It consists of one main beam, to take the stress, encased in a fairing. Note the handle for carrying.

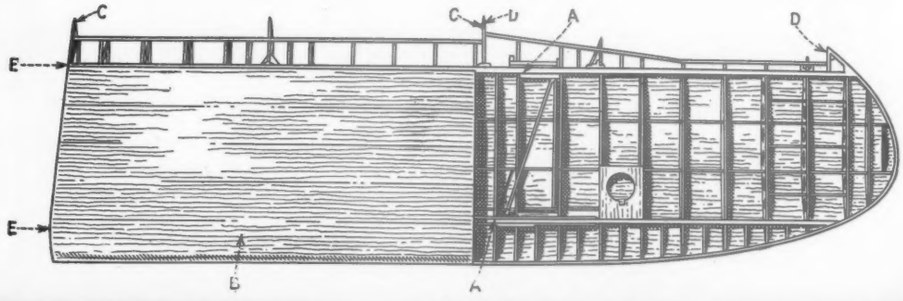


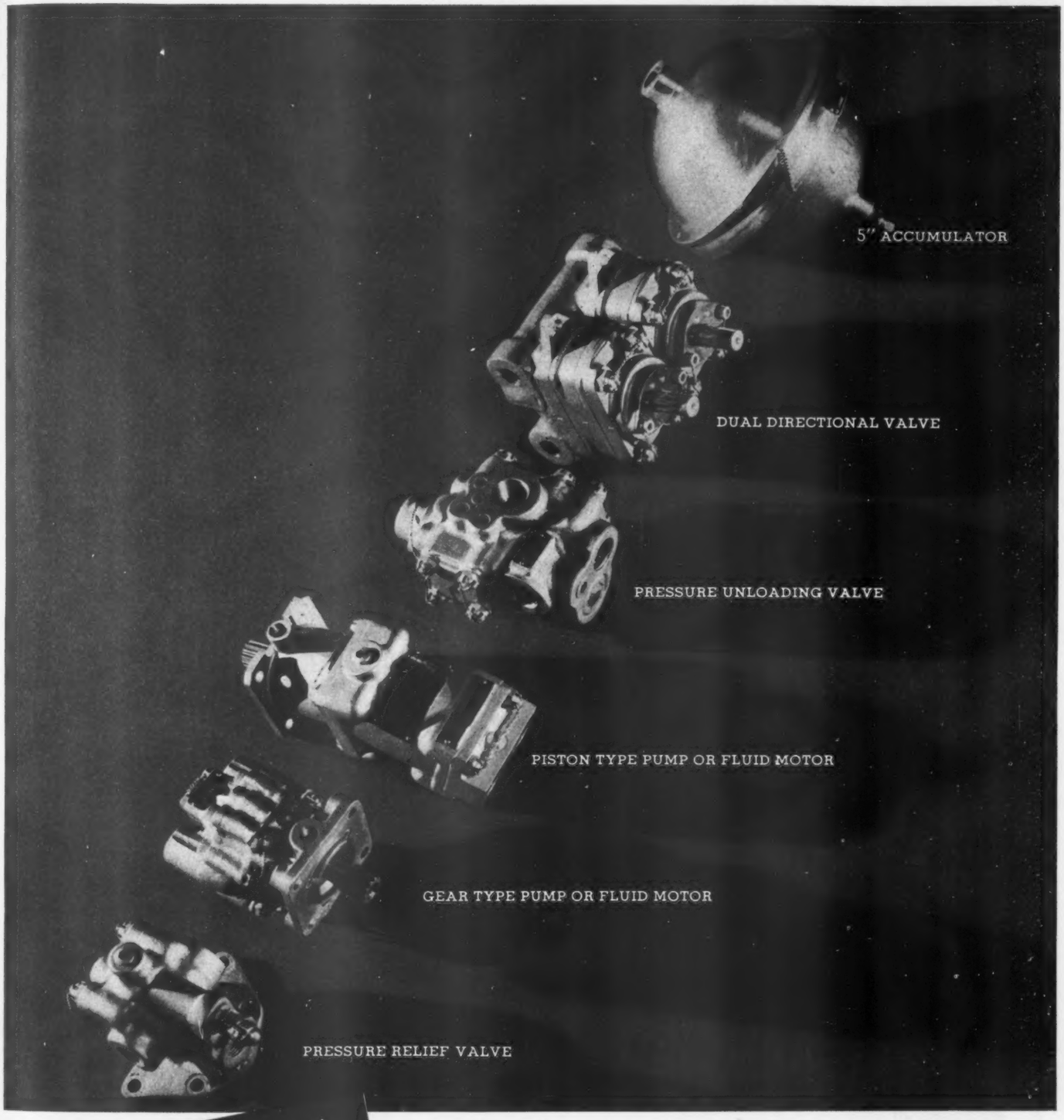
A comparison can be made between the Consolidated wing tip float (above) and the one at the left from the Dornier Muster Do-26. In this case retraction takes place by moving arm "A" hinged at "B" out towards the wing tip while the float swings up being hinged at "C".



The outer wing panel (above) of the Fleetwings Trainer Model XBT-12 is attached to the center section by means of bolts inserted through holes "A". From outside opposite "B" nuts are then attached. "C" is the joint of the main wing spar.

The outer wing panel of the Howard DGA-15 (right) is covered with mahogany plywood "B". At points "A" are chrome-molybdenum strut fittings. "D" are the aileron hinges and "C" flap hinges. "E" are the chrome-molybdenum attachment fittings.





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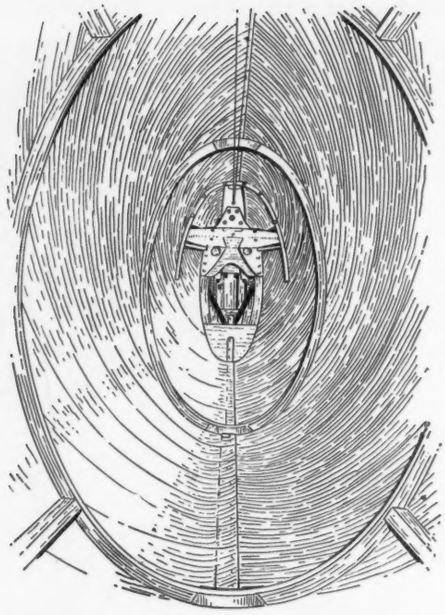
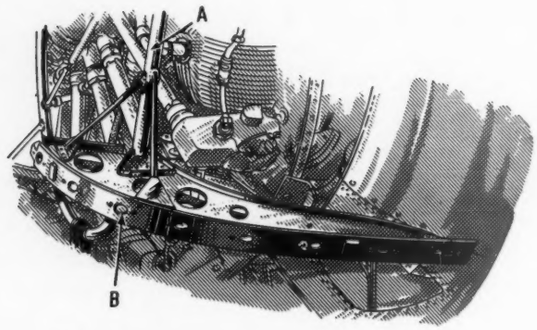
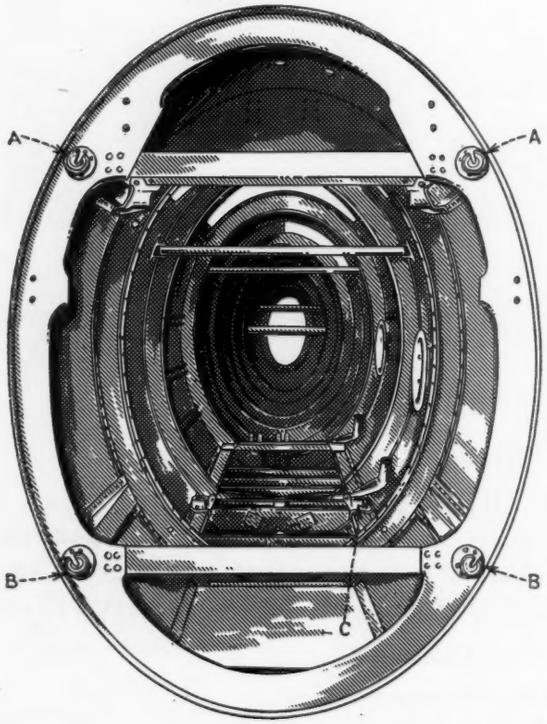
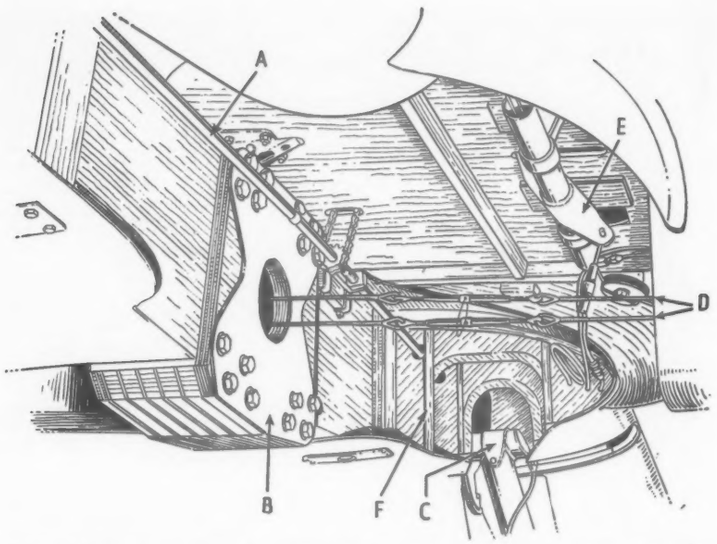


(above) View looking aft showing method of molding Summit HM-5 fuselage. Note join lines on top and bottom and accessibility of tail section for inspection.



The fuselage of the Ryan STA (below) is of semi-monocoque construction with four main longerons. The upper ones at "A" the lower ones at "B". The forward seat is installed at "C" with a duplicate installation immediately behind.

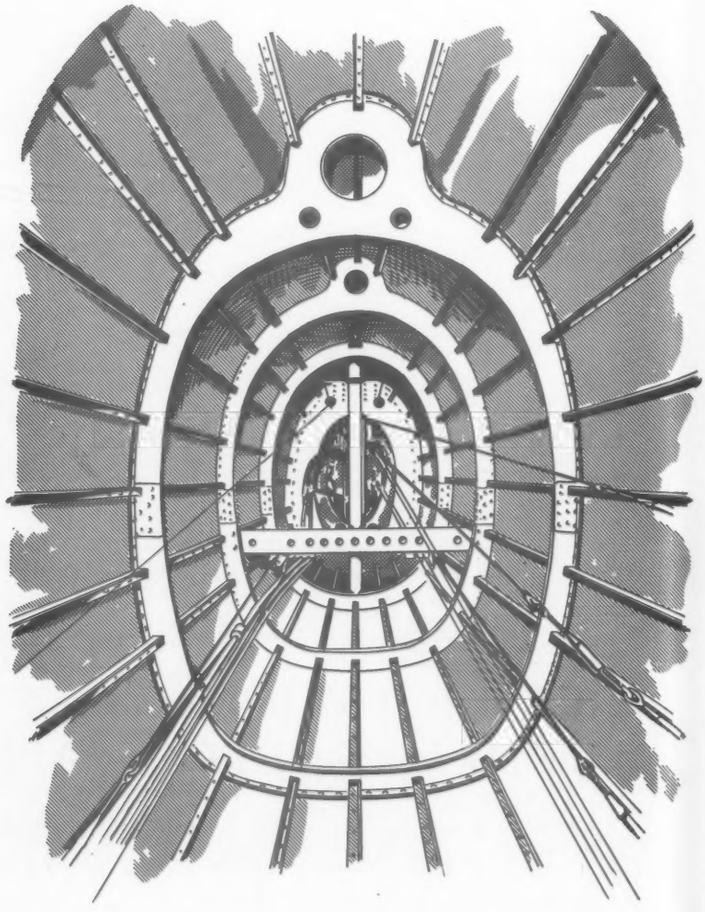




(above) View underneath Summit HM-5 showing "A" landing gear retracting torque tube. "B" the main spar fitting (static tested to 250,000 lb. bending load). "C" landing gear knee and gear quadrant. "D" rudder cables. "E" the stick control elevator horn and "F" the molded gear well rib for landing gear retraction.

The cowl of the Fleetwings Trainer Model XBT-12 (left) is attached to the mounting ring "A" by means of the assembly "B" attached at four points around "A" by means of Dzus fasteners. The cowl sections are easily removed for engine inspection.

Fuselage of the Vought-Sikorsky V-143 (below) is of semi-monocoque construction with channel type frames spaced at approximately 14" intervals supporting outer skin covering. The skin is supported longitudinally by extruded aluminum alloy stiffeners spaced approximately 5" apart. The longitudinal stiffening angles are held in place by the same rivets which tie the skin plates together, so that each skin plate is stiffened along each edge.



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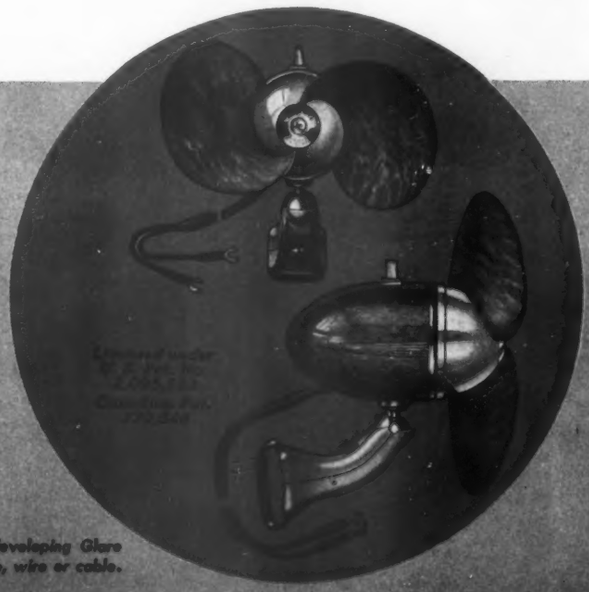

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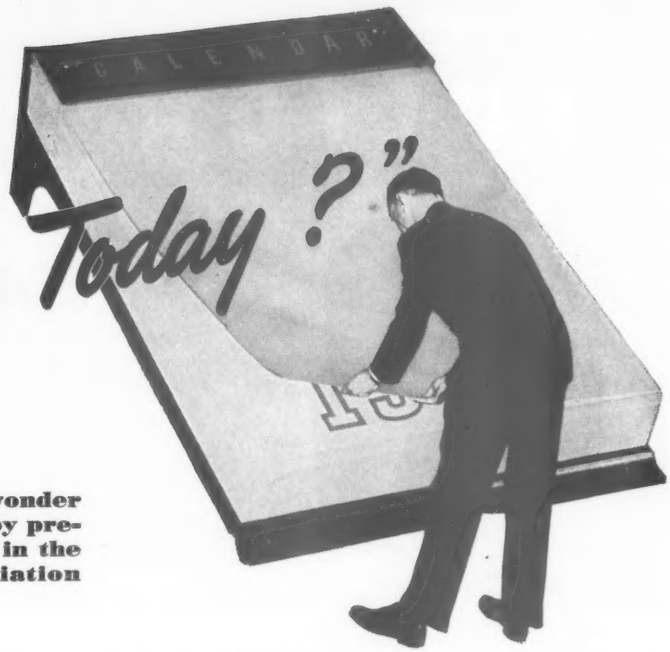

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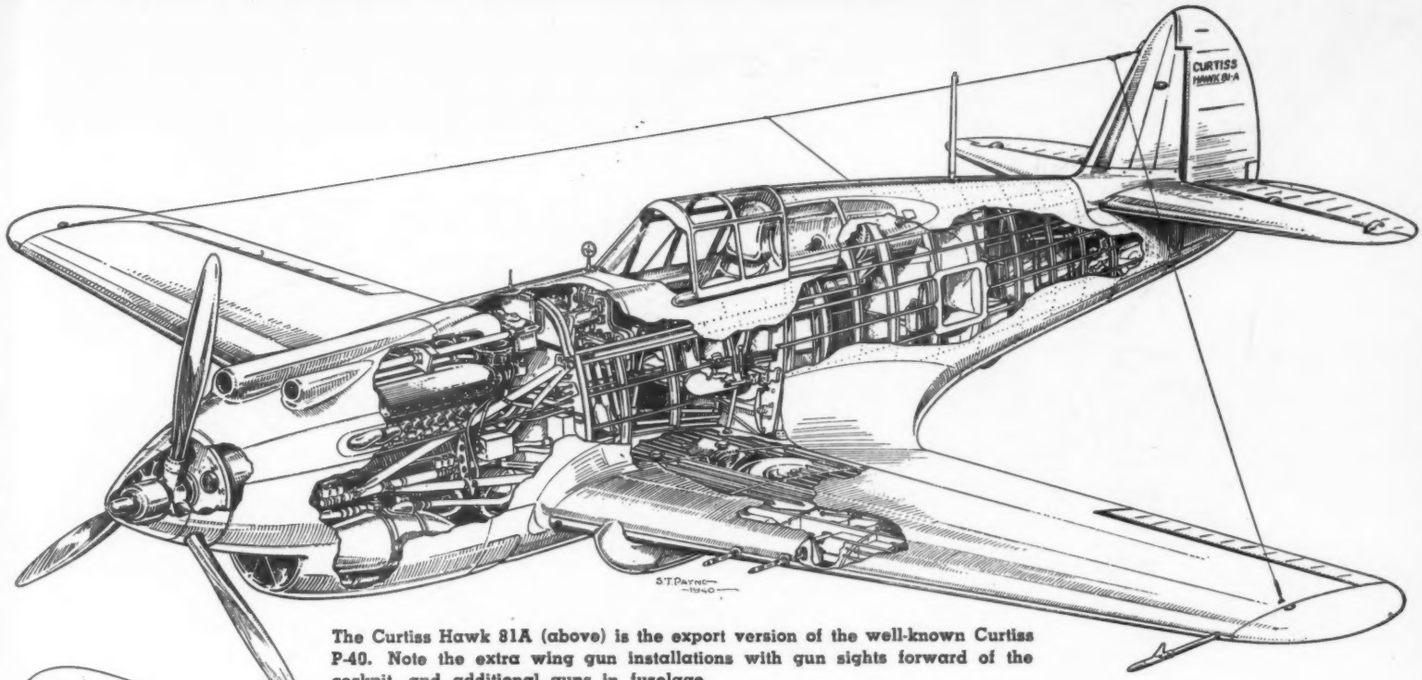
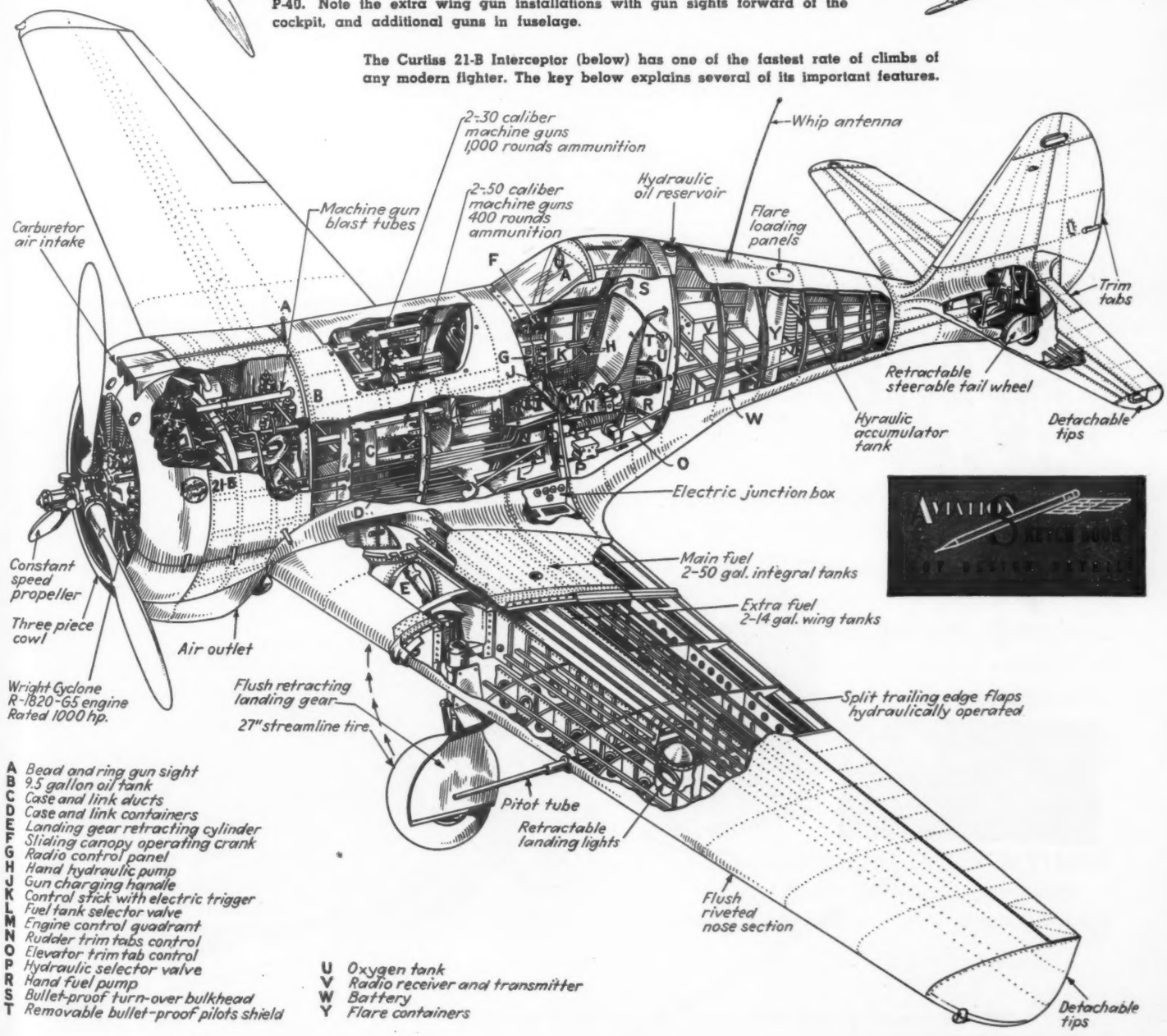


The Curtiss Hawk 81A (above) is the export version of the well-known Curtiss P-40. Note the extra wing gun installations with gun sights forward of the cockpit, and additional guns in fuselage.

The Curtiss 21-B Interceptor (below) has one of the fastest rate of climbs of any modern fighter. The key below explains several of its important features.



A Bead and ring gun sight
B 9.5 gallon oil tank
C Case and link ducts
D Case and link containers
E Landing gear retracting cylinder
F Sliding canopy operating crank
G Radio control panel
H Hand hydraulic pump
J Gun charging handle
K Control stick with electric trigger
L Fuel tank selector valve
M Engine control quadrant
N Rudder trim tabs control
O Elevator trim tab control
P Hydraulic selector valve
R Hand fuel pump
S Bullet-proof turn-over bulkhead
T Removable bullet-proof pilots shield
U Oxygen tank
V Radio receiver and transmitter
W Battery
Y Flare containers

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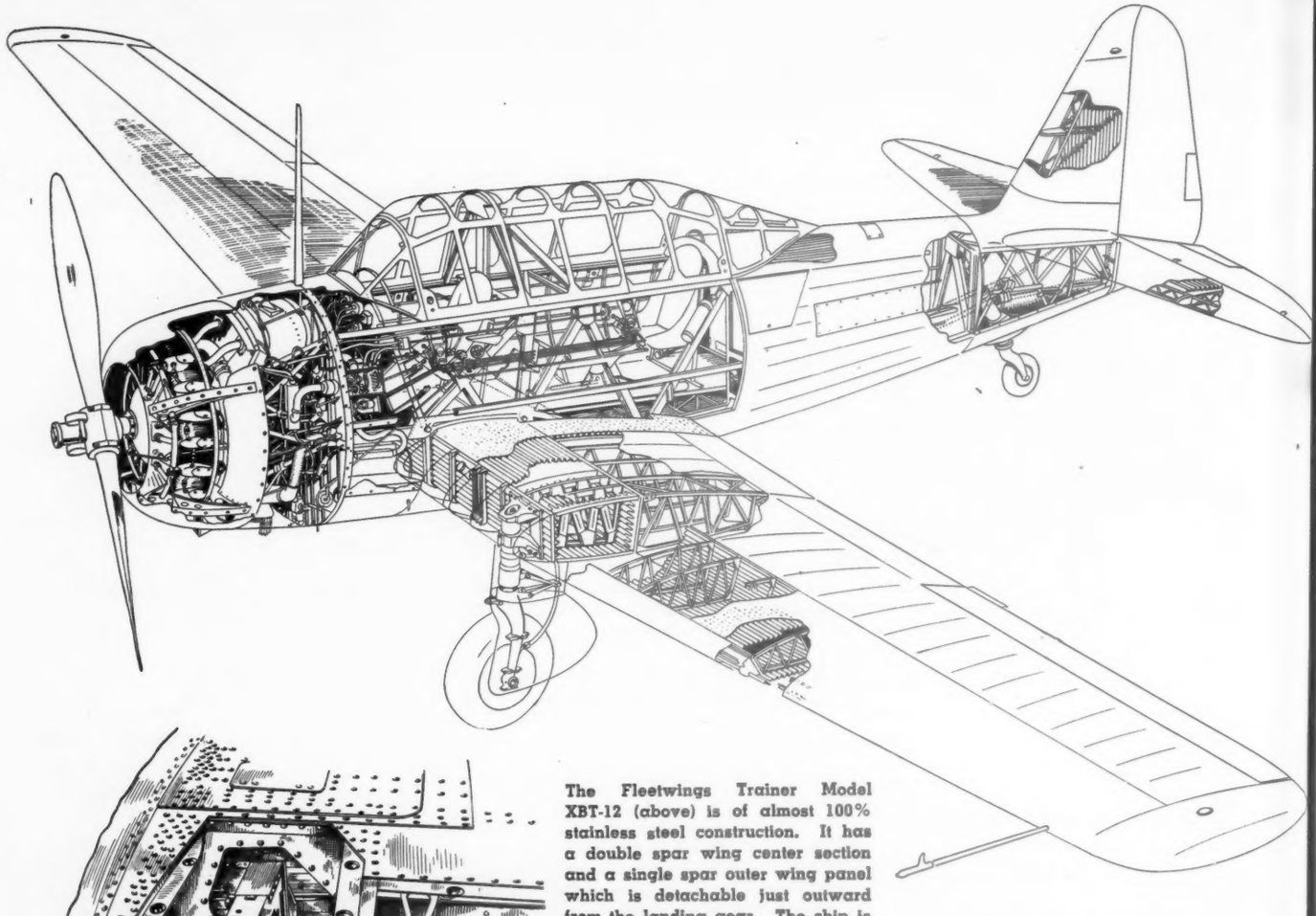
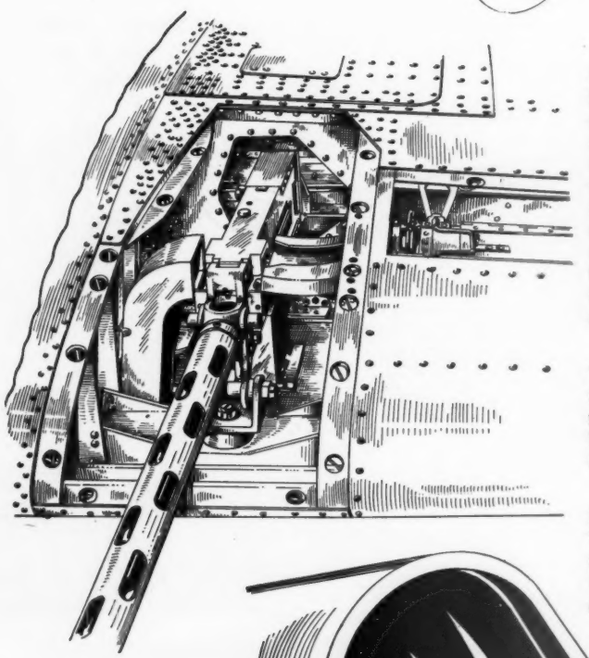
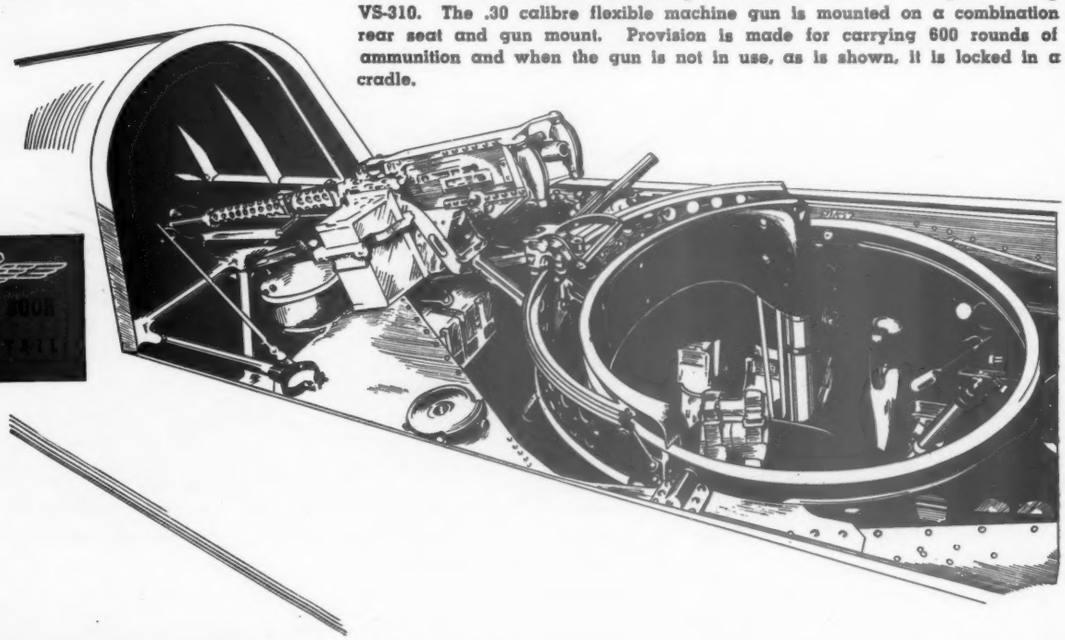




The Fleetwings Trainer Model XBT-12 (above) is of almost 100% stainless steel construction. It has a double spar wing center section and a single spar outer wing panel which is detachable just outward from the landing gear. The ship is extremely sturdy in construction and affords exceptionally good visibility to facilitate student instruction. Note the use of corrugated stainless steel to take the main loads in the wing and tail surfaces. (See pages 120, 122, and 124 of the Sketch Book for additional detail drawings.)

The .30 calibre machine gun (left) is installed in the Republic EP-1 Pursuit and is capable of carrying 1000 rounds of ammunition. The container at the right is the ammunition box feeding cartridges into the gun through the chute. The link ejection chute is located just to the left of the gun. Note that the gun has had to be inserted through a hole in the wing spar.

Below is a view of the flexible gun installation in the Vought Sikorsky VS-310. The .30 calibre flexible machine gun is mounted on a combination rear seat and gun mount. Provision is made for carrying 600 rounds of ammunition and when the gun is not in use, as is shown, it is locked in a cradle.



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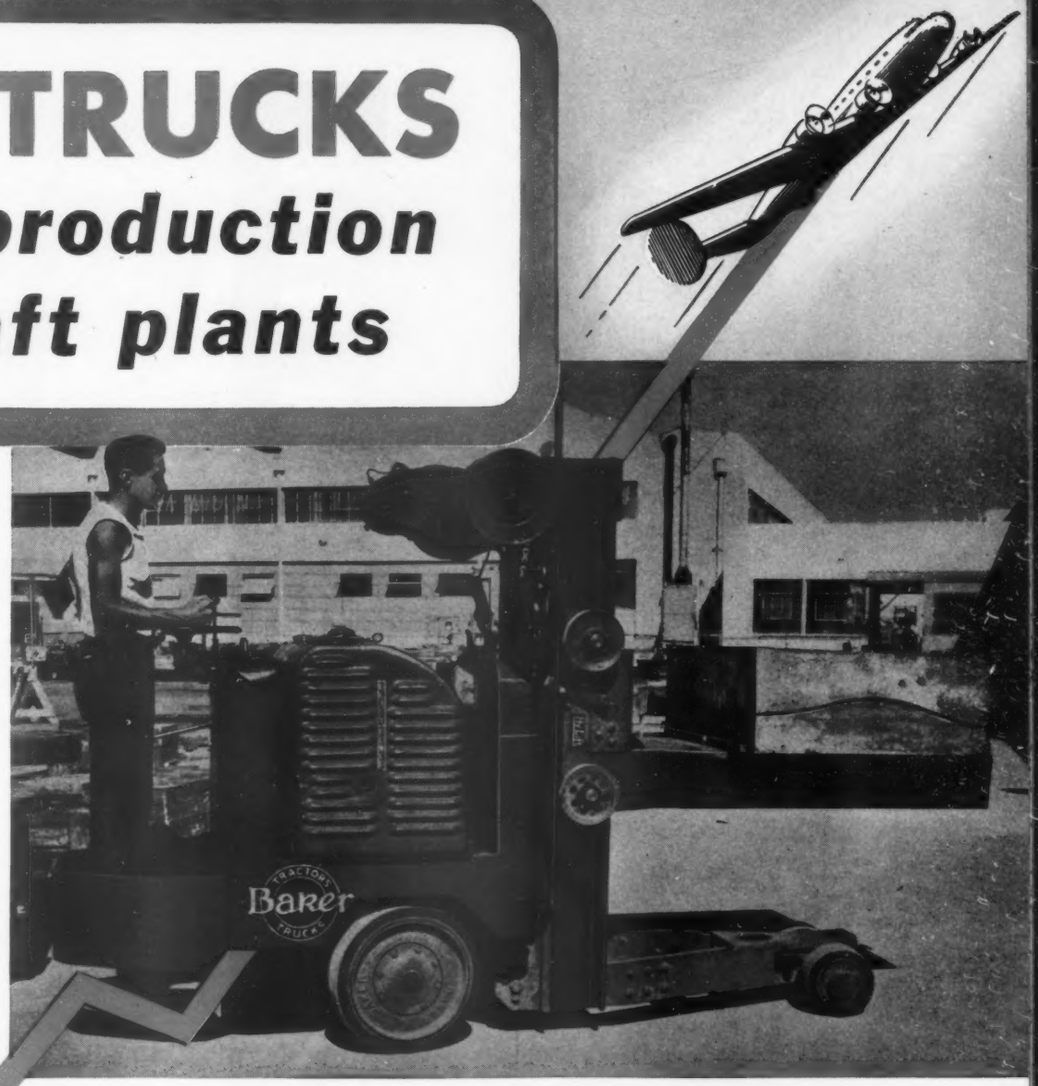
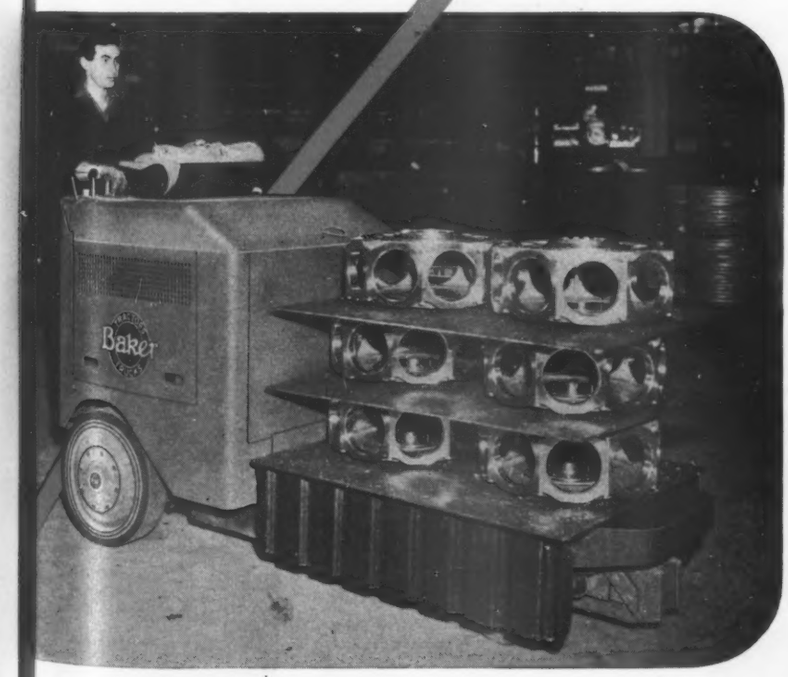


BAKER TRUCK AT NORTH AMERICAN (Right) Changing and moving dies is a much faster, simpler and safer operation with this 6000 lb. capacity Hy-Lift Truck with die-pulling winch, in service at the North American Aviation plant at Inglewood, California.

BAKER TRUCK AT WRIGHT AERONAUTICAL (Below) Six radial engine crankcases are handled easily with this Baker Low-Lift Elevating Truck — one of 8 in service at the Wright Aeronautical Corporation, Paterson, N. J.



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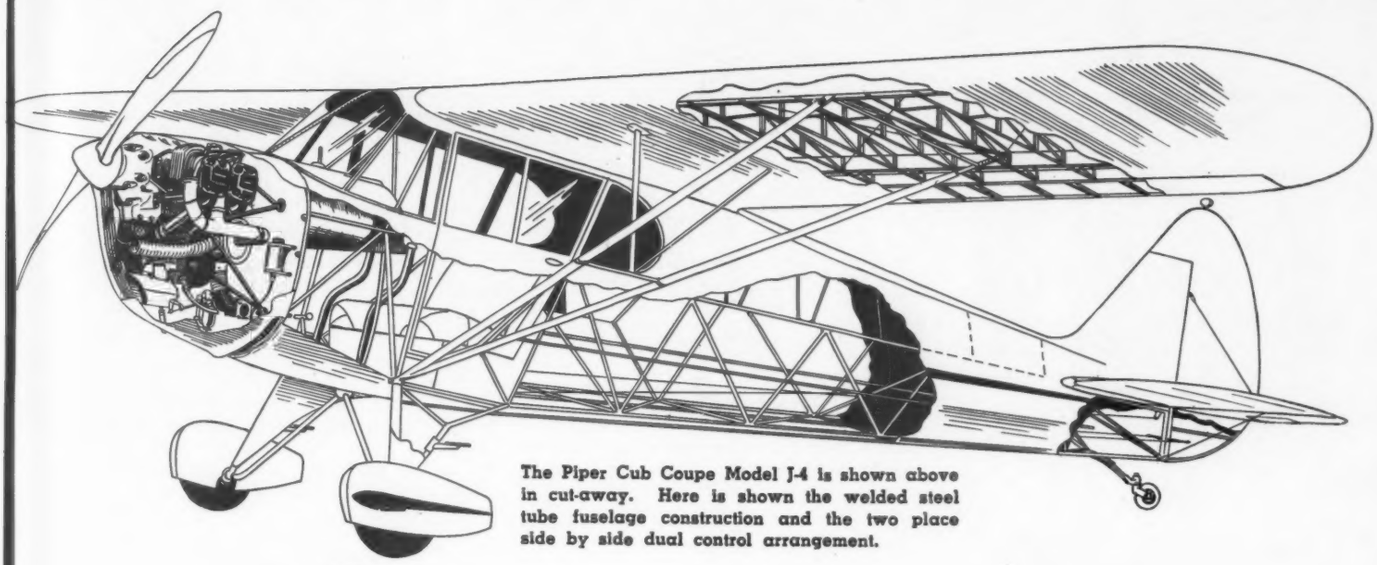
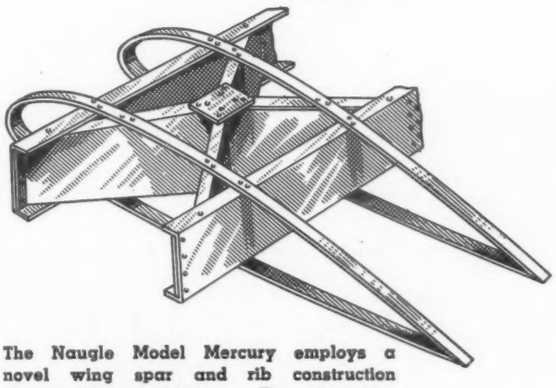
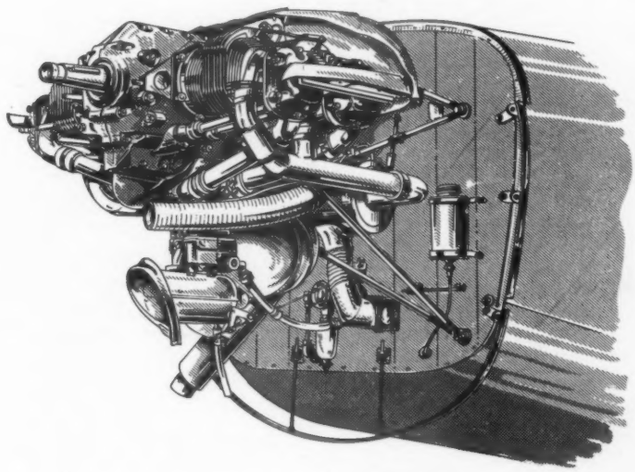


The Piper Cub Coupe Model J-4 is shown above in cut-away. Here is shown the welded steel tube fuselage construction and the two place side by side dual control arrangement.

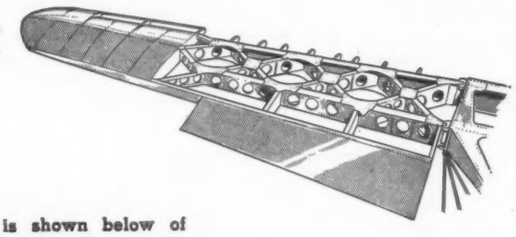


The Naugle Model Mercury employs a novel wing spar and rib construction shown above and below. The wing spar is made up of two main spar sections joined by X members around which the ribs are built attaching fore and aft as shown.

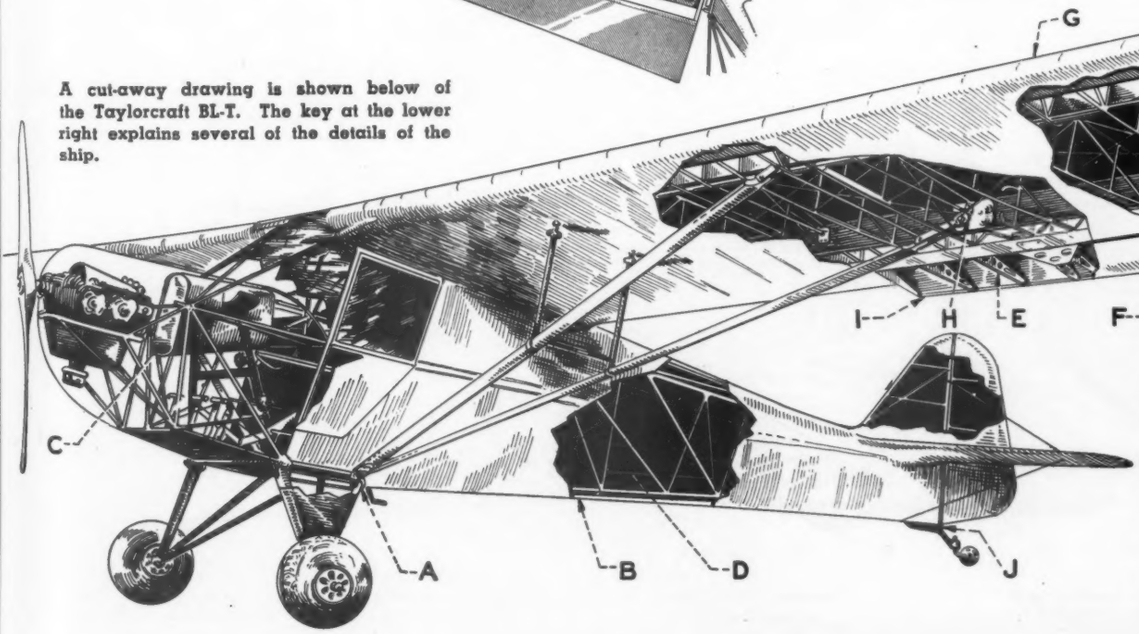


A Continental engine is shown above installed in a Piper Coupe, whose cut-away drawing is at the top of the page. Notice the exhaust system.

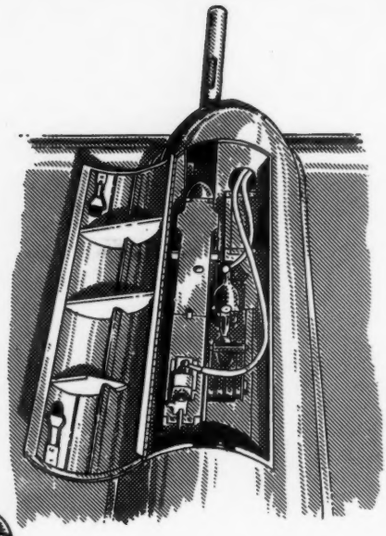
Another view of the Naugle wing spar construction.



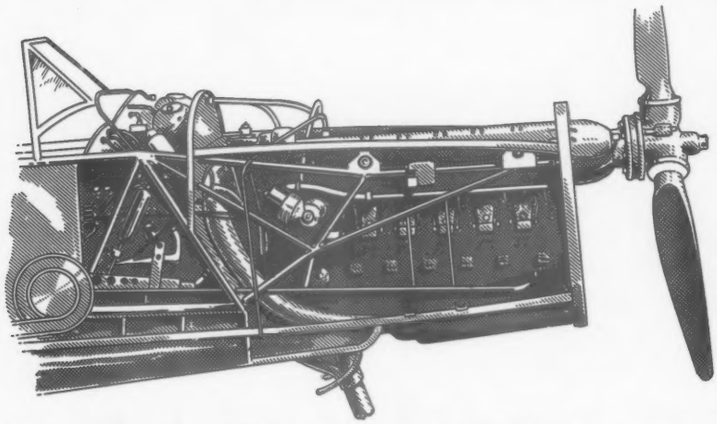
A cut-away drawing is shown below of the Taylorcraft BL-T. The key at the lower right explains several of the details of the ship.



A - Landing gear with replacable bronze bushings
B - Four longeron fuselage
C - Rubber mounted gas tank
D - Flexible steel control cables
E - All metal rib construction
F - Reinforced spruce spars
G - Nicralumin leading edge
H - Strut fittings
I - Balanced type aileron
J - Tail spring

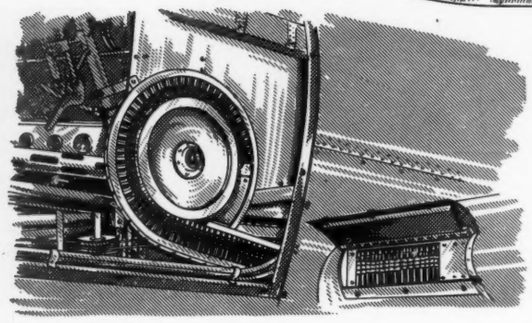


The wing boom gun (left) in the Fokker D.23 (below) uses Browning-FN, shell guns, calibre 13.2 mm, with a firing rate of 1000 rounds per minute.



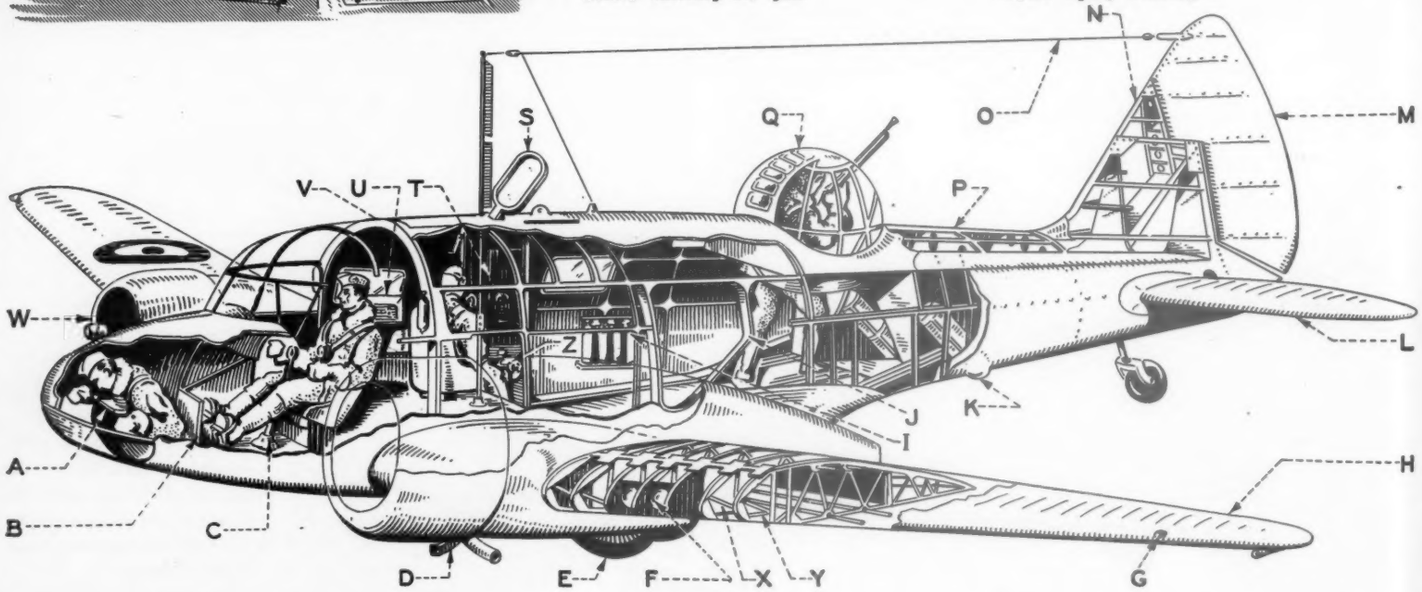
The front and rear engines in the D.23 are Walter Sagitta ISR engines, each of which develops 528 hp. at 2600 rpm. Note that the engine mount is constructed as an integral part of the fuselage structure.

A cut-away is shown below of the Fokker D.23 illustrating the use of tandem engines and retractable tricycle landing gear.



The fuselage guns (left) are two synchronized Browning-FN guns calibre 7.9 mm. with a rate of fire of 1300 rounds per minute. The cartridges are stored in the wings and follow this circular track before entering the gun.

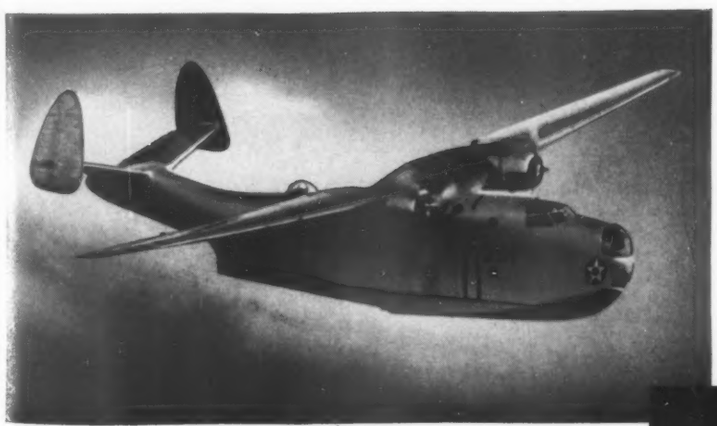
A cut-away is shown below of the British Airspeed Oxford. This ship is an "All-Purpose" Trainer and may be fitted for practice bombing; radio, navigation and gunnery instruction; or advanced twin-engine flying training.



A- Bomb-aimer using sight through transparent panel
B- Pilot's foot guard
C- Pilot's flying controls, dual controls may be installed at starboard side for instructor
D- Air intake
E- Undercarriage retracted backwards into the nacelle
F- Landing lights
G- Navigation light
H- Plywood-covered stressed-skin main wing
I- Oxygen stowage
J- Cabin door opening
K- Flare chutes
L- Plywood-covered tail and fabric-covered, wooden-frame elevator
M- Fabric-covered wooden-frame rudder
N- Fabric-covered, wooden-framed fin
O- Fixed aerial
P- Stressed-skin plywood covered fuselage, some stringers have been omitted for clearness
Q- Removable revolving gun turret
S- Retractable D. F. radio loop half raised
T- Radio
U- Parachute stowage
V- Specially strong front bulkhead to protect crew in nose-over crash
W- Starboard engine in N.A.C.A. cowl, the port-engine has been omitted to give a better view of the cabin interior
X- Fuel tank in wing between spars
Y- Spruce lattice ribs and box spars shown in section
Z- Trailing aerial reel

Wings for The Two-Ocean Navy

The Martin PBM-1



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Playing its important part in this program is the Martin PBM-1, a 20-ton long-range flying boat designed for Mid-Ocean patrol. Carrying a normal crew of seven, the gull-wing Martin, with Curtiss Electric Propellers, is a potential power-house both on the offense and defense.

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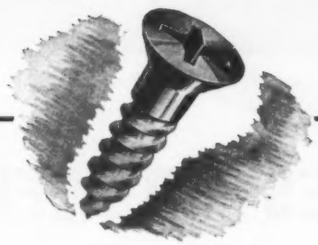

AMERICAN SCREW COMPANY
Providence, Rhode Island

CENTRAL SCREW COMPANY
Chicago, Illinois

CHANDLER PRODUCTS CORP.
Cleveland, Ohio

CONTINENTAL SCREW COMPANY
New Bedford, Massachusetts

THE CORBIN SCREW CORPORATION
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THE LAMSON & SESSIONS COMPANY
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NEW ENGLAND SCREW COMPANY
Keene, New Hampshire

THE CHARLES PARKER COMPANY
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PAWTUCKET SCREW COMPANY
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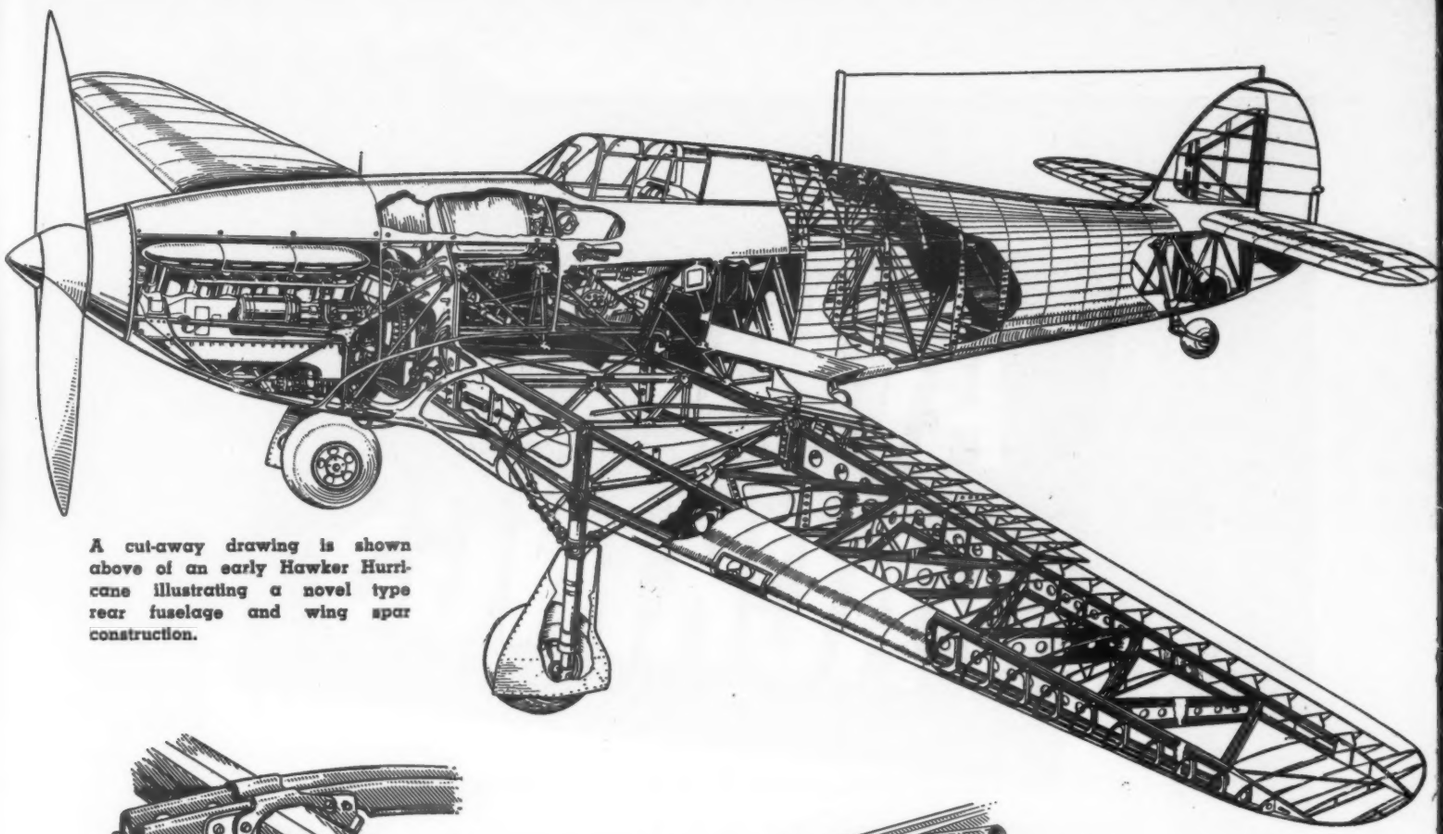
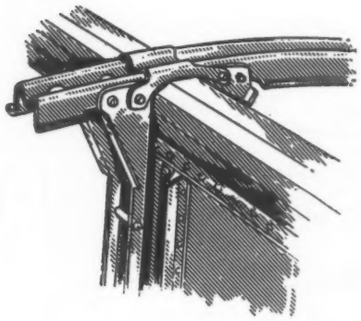
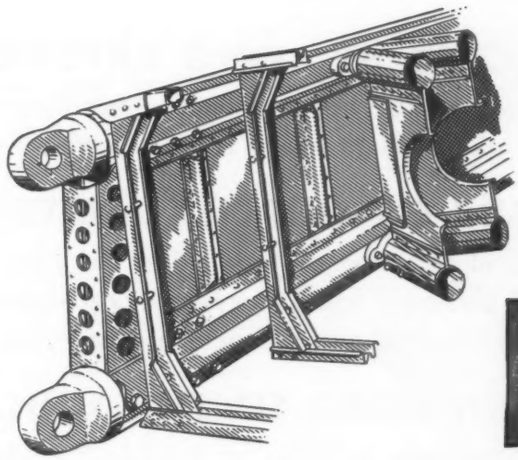


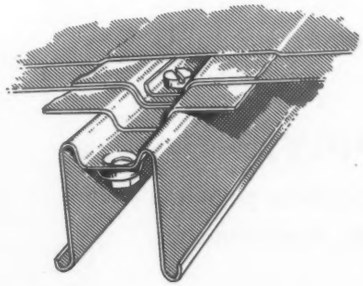
A cut-away drawing is shown above of an early Hawker Hurricane illustrating a novel type rear fuselage and wing spar construction.



The wing ribs of the Hurricane are attached to the wing spars by the fitting shown above.

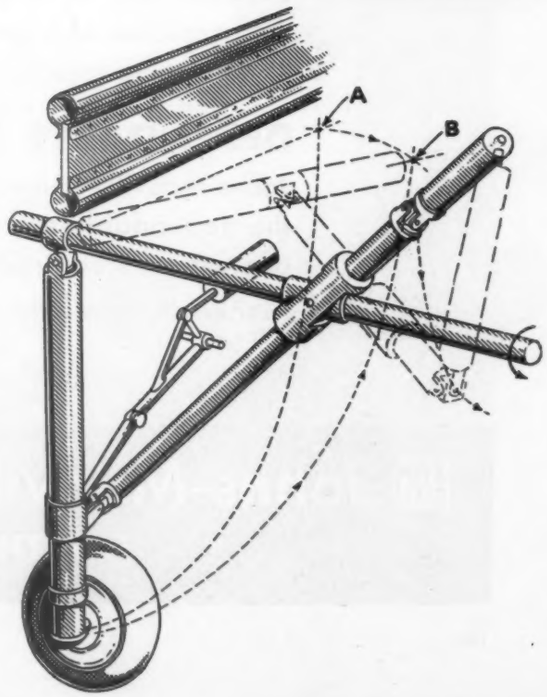


AVIATION SKETCH BOOK OF DESIGN DETAIL



The skin is attached to the wing ribs by a very unique process illustrated above, with the wing spar being the bottom inverted U section. Immediately on top of this is placed a wide flanged hat secverted U section. Next comes the skin on top of which is another wide flanged hat section and in the center is placed a small lock strip; through all of these goes a bolt which fits into a nut, which is a permanent part of the bottom U section. Over all of this is then placed a final covering to give a smooth surface.

The main wing spar of the Hawker Hurricane is made of two tubular sections on top and bottom joined by a stiffener reinforced shear web. The typical truss spar joint is illustrated here as well as the fittings for joining the outer wing panel to the center section.



The landing gear of the Hawker Hurricane is retracted as shown in the diagram at the right. By turning the horizontal torque tube, as shown, the wheel is swung first to position "A" then by further turning it is swung back to position "B".

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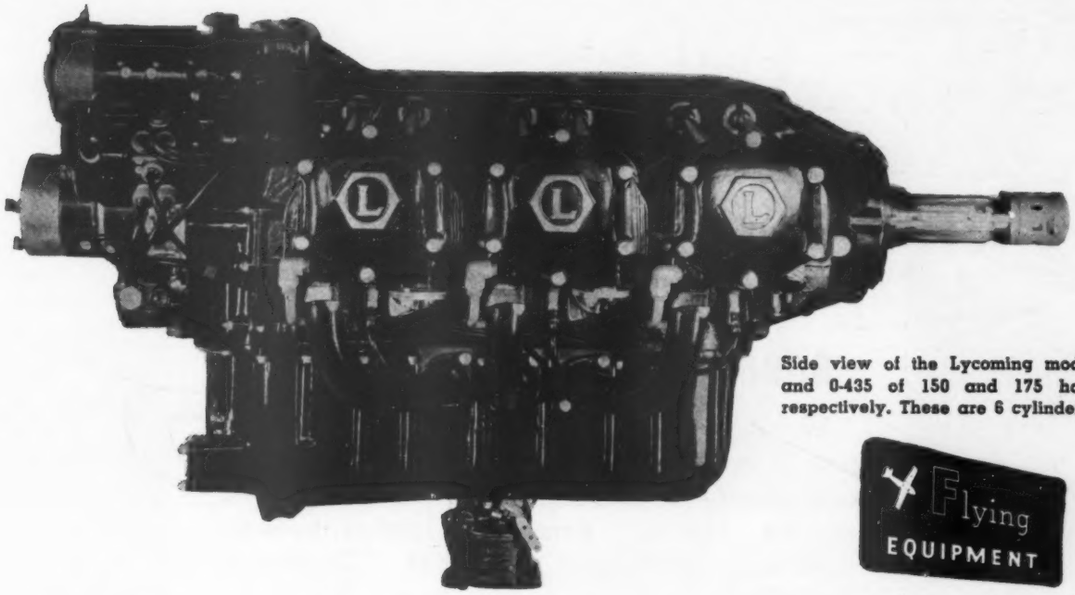


Side view of the Lycoming models 0-350 and 0-435 of 150 and 175 horsepower respectively. These are 6 cylinder engines.

Flying EQUIPMENT

4 New Lycoming Engines

From the Lycoming Division of the Aviation Manufacturing Corp., comes the announcement of four new horizontally opposed, air-cooled engines ranging from 100 to 175 horsepower.

Two of the recently announced engines, designated Lycoming 0-235 and Lycoming 0-290, have four cylinders and are rated 100 and 125 horsepower, respectively. Basically the same, these engines differ only in displacement. The other two new Lycoming engines, 0-350 and 0-435, are six-cylinder, direct-drive power plants of 150 and 175 horsepower with the same basic specifications, excepting displacement.

Cylinder assemblies of the new engines consist of aluminum cylinder heads, screwed and shrunk to steel cylinders. Cooling fins are integral with the cylinder head casting and the cylinder barrel. The cylinder assemblies are fastened to the crankcase by means of studs and nuts. Each cylinder is equipped with two spark plugs located on opposite sides of the cylinder and installed in aluminum bronze spark plug bushings which are screwed and shrunk into the cylinder head.

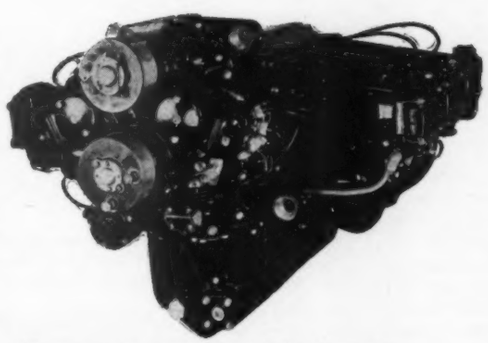
The crankcases of these new Lycoming engines consist of two aluminum alloy castings, split on the vertical centerline through the crankshaft bearings. Four copper-lead, steel-back, precision type main bearings are used on the four-cylinder models, while the six-cylinder models have an additional ball thrust bearing at the forward end of the case. The two halves of the crankcases are secured by means of studs and nuts and are heavily ribbed throughout for maximum strength.

Pistons are of aluminum alloy, heavily ribbed under the head for maximum strength and heat dissipation. Each piston is equipped with two compression and two oil-control rings. Full-floating piston pins are 1⅛-inch in diameter and have aluminum alloy retaining plugs.

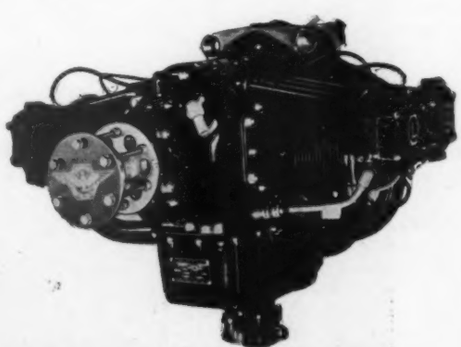
The fuel induction system consists of a single-barrel carburetor of suitable size fastened to the bottom of the oil sump. The distributing zone of the induction system is integral with the sump casting and is submerged in oil to provide sufficient heat to the fuel mixture for satisfactory distribution and cold weather operation. All models are equipped with dual magnetos which are spur gear driven from the timing gears.

Lubrication is of the full-pressure type, including valve mechanism. Crankshaft is equipped with centrifugal sludge removers on all crankpins and pistons, piston pins and accessory drive gears are lubricated by splash. Oil capacity is 8 quarts for the four-cylinder and 12 quarts for six-cylinder models.

Drives for dual magnetos, starter and single tachometer are standard on all the new Lycoming models. In addition, drives for fuel pump, vacuum pump, generator and dual tachometers can be supplied as optional equipment. (For complete specifications see tables page 113.)



Three-quarter rear view of the Lycoming engine models 0-350 and 0-435.



Models 0-235 and 0-290, 4 cylinders opposed, of 100 and 125 horsepower respectively.

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In factory, hangar and field, the "Clarktor-6" tow ships about deftly, swiftly, safely. Easy and simple to operate, gas-powered for 24-hr. service. The U. S. Army uses 1500 of them for handling airplanes! Ask for "Clarktor-6" Bulletin.
Write also for "Clark" Fork Truck Bulletin, describing lifting, carrying and tiering finger-trucks for handling motors and other parts in receiving, storage and production departments.
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"Clarktor-6" Tractor towing North American Aviation Company's B-25 Twin Engine Bomber on flight ramp, Inglewood, Calif.
CLARK

THE AVIATION NEWS

BLAINE STUBBLEFIELD, Washington
C. F. McReynolds, Pacific Coast
Jay P. AuWerter, New York
E. R. Lockin, New York

FEBRUARY 1941

Auto Firms To Contract With Plane Builders
4 Plants Will Assemble 100 Bombers per Month

Three hundred bombers a month about a year or more from now is what Knudsen's plan for utilization of unused automotive facilities seems to boil down to. When the plan goes into operation it will provide 100 a month each of Martin B-26 and North American B-25 two-engine bombers and Consolidated B-24 four-engine bombers. Output rates will doubtless be stepped up beyond these figures as the program gets farther along.

As the plan stands, the government will build and own at least four assembly plants. Martin will operate a plant at Omaha, and will take a contract from the Air Corps for some 4,000 B-26s. It will sub-contract manufacture of most of the parts to Chrysler Corp., which will use its existing machinery for the work and use vacant plant space to do sub-assemblies.

Similarly, North American will operate a Kansas City government plant and get its parts under sub-contract from General Motors; there is, of course, a close corporate connection between these firms.

The Consolidated bombers will be assembled in two plants at Tulsa and Fort Worth. That Douglas will operate these plants, under a licensing arrangement is not yet clear. Ford will make the parts for these ships.

Facilities of other automotive manufacturers will be brought into the program via sub-subcontracting by the three auto firms. Chrysler, in particular plans to farm out a great deal of its work for Martin.

Farthest along of the new government-owned plants is the one at Kansas City which North American will operate. This will be a windowless, air-conditioned, fluorescent-lighted, plant with more than a million square feet of floor and employing 10 to 15,000 men. After the war it will be used as an Air Corps maintenance depot.

Meanwhile, management brains, though not physical facilities, of the automotive firms are being drawn into manufacture of air-cooled engines. Ford, Studebaker, and Buick are all in on this. Unlike the plane parts program, this work involves construction of entire new plants. Little attempt is being made to apply automotive technics; plants generally duplicate existing Pratt & Whitney and Curtiss layouts.

Three engine plant programs are in the Detroit area. Ford is farthest along with his $22,000,000 engine factory and magnesium foundry at Dearborn. He hopes to be producing Pratt & Whitneys by March, but there is considerable scepticism as to whether he can do

(*Turn to page* 152)

Harris & Ewing

PRESIDENT FRANKLIN D. ROOSEVELT has been authorized by the people of the country to build the biggest military force in the world. Largely upon the United States rests the responsibility for a combined British-American air power that must overpower the Axis air arm if the Democracies are to win the war. Here you see the President on his recent visit to the Buffalo plant of Curtiss-Wright. He is talking to the 9000 employees over the speaker system.

MEET AIR MARSHAL Sir Hugh Dowding, chief of the RAF during the blitzkriegs of last September, now head of Britain's home defense air war. This picture was taken as the gentle-mannered Scot told Washington newsmen that Britain would stop Nazi night bombing by Spring; that RAF will hold control over the Islands, which will prevent a German invasion. Sir Hugh is calling on American aircraft manufacturers, helping to coordinate production of the two countries.

Roosevelt Suggests CPT Changes; Cuts Budget Expect Militarization; "Deferred Enlistment"

President Roosevelt at a recent press conference said that CPT students are not disposed to enter Service and that the training is not particularly adapted to military flying. At the same time, publication of the President's Budget estimate of appropriations showed the CPT cut from $37,000,000 in 1941 to $18,000,000 for fiscal 1942.

This combination of remarks and budget cut looks as if Army and Navy officers, unfavorable to CPT as a military adjunct, had sold the President their ideas. It is known that some high Service officers opposed the CPT, but those in command until recently supported it. Recent changes in the Air Corps command are noticed as possibly back of the President's new stand.

Of course the Civil Air Administrator will plead before committee for reinstatement of the 1942 fund at something like that of last year. Argument will be that here is a set-up of 700 air schools in 700 colleges; this plant by June will have given 90,000 courses to 70,000 persons; has turned out 50,000 student pilots 19 to 26 years old with two years of college; that the cutting of expensive attrition and giving so many a feel of the air, is well worth the low cost per individual. CPT was organized in accordance with Army-Navy views. Obviously they have now changed their minds, or an opposing group has supplanted the approving group. Either way, say friends of CPT, it looks like see-sawing at a bad time.

On the President's side, it can be said that CPT was set up as a military project in civilian disguise, because the public at that time would not have accepted training for fighting. Now, the false whiskers are off. Possibly it's a change of politics and not of training methods.

Changes in CPT are suggested by National Aeronautic Association and others: higher-powered ships for secondary; regular military discipline; legal obligation of graduates to join Service if called; physical standards at par with Service standards.

In face of a real emergency, with a need for the fastest military training, regardless of cost and public opinion, authorities say that direct military action would be fully justified.

Incidentally, the Air Corps and Navy would have no trouble getting plenty of grade-A pilot material under present physical standards, if the Government was willing to encourage men to leave school and jobs.

Student accident insurance is down again; instead of $500 in hospitalization, the $9 premium buys $1,000 worth.

Twenty South American college students in the US will be given the regular CPT primary course.

The Boomerang Plane

Igor Sikorsky, engineering manager of the Vought-Sikorsky division of United Aircraft, has made several hundred test flights since last March in his VS-300 helicopter. It has demonstrated its ability to rise vertically and obliquely, to fly forward, backward, or sideways, and to hover over one spot in air ranging from dead calm to 25 mph.

RAF Chief Talks

Chief Marshal Sir Hugh Dowding, head of the RAF in the blitzkrieg days of September, is contacting U. S. aircraft manufacturers.

The blue-eyed, gentle-voiced Scot says the British have a defense against night bombing, which he thinks will be in full effect this Spring.

Sir Hugh praised the Lockheed Hudson, which is being received and equipped with a turret which fires aft. Martin medium bombers are going to the middle East. The Curtiss P-40s are doing fine, with some modifications. Douglas DB-7 is playing two roles in the fighting; he didn't name them.

Bombers are flying the Atlantic all the time; Lockheed, Consolidated, and others. He says any bomber can do it if part of the dead load is left behind.

Sometimes a Nazi squadron follows one leader, but the Germans install excellent instruments in all their planes. Absolutely no inferior gasoline has been found in downed Nazi ships, but some strange stuff has turned up in German motor transport.

Airplanes cannot yet be built on automobile production lines; too much advantage lies in design; radical design changes are necessarily frequent. Standardization may come in some future war.

AC Flys Infantry

The fighting cocks of Europe, making a fine art of war, have worked out some tricks we've done little or nothing about. One of them is air transport of parachute troops and infantry. The Army is rehearsing them both now: parachuters at Fort Benning, Ga., and flying infantry at Fort Sam Houston, Tex.

The idea in airplane soldiery is to land men and combat equipment on fields already captured by parachuters, or lightly held by the enemy. Troops must have subsistence and ammunition for 24 to 36 hours, according to *Army and Navy Journal*, until land support arrives.

McCarran Proposes Independence for CAA Safety Board to NACA; Abolish Administrator

Washington (AVIATION BUREAU)—Again, as anticipated, Senator McCarran has moved to restore the Civil Aeronautics Authority to an independent status outside the Department of Commerce. He proposed the reorganization in Senate Bill No. 1 of the 77th Congress.

This legislation would abolish the Administrator and transfer his functions to the chairman of the re-instated five-man Civil Aeronautics Authority. The chairman of the Board would appoint an Executive Director, within the Board, to whom could be delegated any or all of the administrative functions to be transferred to the Board.

Functions of the recently-abolished Air Safety Board would be given to the National Advisory Committee for Aeronautics, on the ground that it is a body of highly-respected aeronautical authorities. The Safety Board within NACA would be completely independent of the CAA.

McCarran will tell Congress that 473 persons were killed under Commerce air regulation between 1927 and June 1938; that for 17 months under the Safety Board there were no fatalities; that since Commerce again acceded to authority in June 1940, there have been four major accidents, killing 43 persons. He will try to show that the accidents are the result of politics.

NACA did not agree to accept the Safety Board; probably will testify against the wisdom of such a move, in fear of political troubles, which it avoids like the measles.

Various Capital observers expressed opinion that Congress, anxious to preserve unity in the emergency, will hesitate to rebuff the President with Sen. McCarran's proposal, but that any more accidents might tip the scale in his favor.

Wide World

THESE WOMEN will tour the nation to mobilize a fleet of privately-owned planes for humanitarian use in countries at war and in disaster stricken sections of U. S. L. to R.: Mercedes Ormston, secretary of Relief Wings; Ruth Nichols, executive director of Relief Wings; Lee Ya-Ching of China; Jane Hyde. All are pilots.

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Bendix **CUSHION CLAMPS** are manufactured to Army-Navy 755 tube clip specifications, and are available in all sizes. To simplify purchasing and stock control Army-Navy size designations are used throughout and all Bendix **CUSHION CLAMPS** are plainly marked for rapid identification.

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AVIATION PEOPLE

WILLIAM E. SCHAEFER, in aviation since 1916, has been made general superintendent in charge of manufacturing operations for Republic Aviation Corp., under factory manager George A. Meyrer.

NEW VICE PRESIDENT in charge of sales for Aeronca Aircraft is Lee H. Smith, formerly assistant sales manager for Waco Aircraft, and sales manager for Vultee Aircraft.

CONGRESS HAS CONFIRMED the President's reappointment of Edward Warner, AVIATION'S former editor, as a member of the Civil Aeronautics Board. He will serve as vice chairman.

FOLLOWING the tragic death of W. J. Austin, George A. Bryant, executive vice president and general manager of The Austin Co. since 1930, has been elected to succeed him as president and general mgr.

Inst. Aero. Sciences

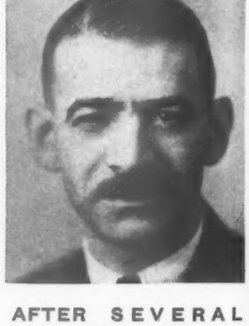
THE ANNUAL SPERRY AWARD (to a young man for contribution to the advancement of aeronautics), was won by Dr. W. Bailey Oswald, of Douglas Aircraft, for studies in aerodynamics.

1941 OFFICERS of the I. Ae. S. are: Pres.: Frank W. Caldwell, above; V.P's: H. L. Hibbard, W. A. M. Burden, C. H. Colvin, P. G. Johnson, L. D. Gardner; Treas.: G. Loening; Sec'y.: C. E. Sinclair.

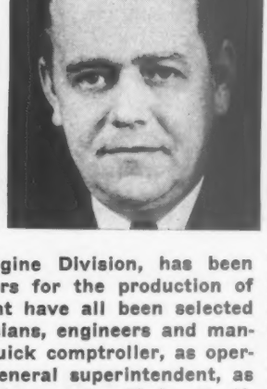
BUSY SWITLICK PARACHUTE & EQUIPMENT CO., has appointed Kenneth W. Wolcott sales and advertising manager. The Switlick factories have a $3,000,000 backlog.

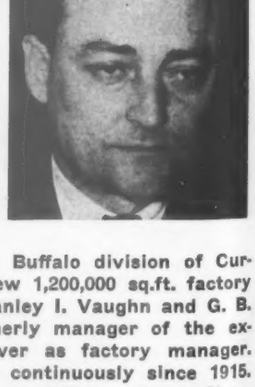
APPOINTED ASSISTANT to the general manager of Wright Aeronautical, Rudolph F. Gagg will work on special projects. With Wright since 1930, he supervised construction of the Lockland plant.

FORMERLY MANAGER of the Technical Department of the Aeronautical Chamber of Commerce, Robert W. Ayer joins the executive staff of Fleetwings, Inc., as assistant to the president.



AFTER SEVERAL MONTHS' illness, Lawrence O. Guinther, manager of Goodyear's Airplane Tire Sales Division, died on Dec. 29. In the Air Service during the war, he was also an Air Race official.





A SEPARATE ORGANIZATION, the Aircraft Engine Division, has been created by Buick Motor Division of General Motors for the production of aircraft engines. Personnel of the new department have all been selected from within the Buick Co., affecting 40 key technicians, engineers and managers. Heading the project is D. E. Williams (l.), Buick comptroller, as operating manager, and J. G. Hammond (c.), Buick's general superintendent, as general manufacturing manager. Assisting Mr. Hammond will be R. H. Archer (r.), general superintendent, I. H. Larkin, assistant manufacturing manager, and James O'Neil, assistant general superintendent.

TRANSFERRED from the Buffalo division of Curtiss-Wright Corp. to its new 1,200,000 sq.ft. factory at Columbus, Ohio, are Stanley I. Vaughn and G. B. Clark. Vaughn (l.), formerly manager of the experimental shop, takes over as factory manager. He has been with Curtiss continuously since 1915. Clark becomes sales representative. An ex-Navy flyer, he joined the company in 1930, and in 1938 began tests on Curtiss Hawks for French delivery.

Empire Air Training

Orders now being filled by Australia's two largest plane manufacturers include 650 "Tigermoths" and over 800 "Wirraways" for primary and advanced training. In addition, a locally designed advanced trainer and a medium bomber are in the prototype stage, while it is expected that the Bristol "Beaufort" will be produced on a one-a-day basis before the end of the year.

While the Empire Air Training Program calls for 3,000 planes, 12,000 pilots and 26,000 ground-crew members during the first 3 years, Australia has already accepted 12,000 men for flight-crews, of which some 4,000 are in training, not only in Australia, but also in Canada and Southern Rhodesia. Of the ground-crews, some 19,000 are now in training, while an additional 5,500 are expected to enter schools before next spring.

Disagree on Airports Big Expansion Doubtful

On the question whether this country's civil and military aviation needs a super-duper airport expansion program, experts disagree.

The Army has expressed interest in a program of about 600 new and improved civil fields. But it seems well enough pleased with the present schedule of 250. For a program of 200 fields, 12 of them in Alaska and Hawaii, the last Congress appropriated $40,000,000. The President's budget estimate for fiscal 1942, adds $33,000,000 more. About $80,000,000 are needed to do the complete job. WPA is supposed to make the difference. Of course, the actual appropriation may be vastly different from the estimate. The other 50 ports have not yet been provided for.

Civil Pilot Training has been put off of most fields where military and/or civil transport are operating. At least 25% of the nation's fields are closed to private flying.

The Air Corps has moved onto about 38 civil air fields.

Probably Army will not occupy any more civil fields as it stands organized now under the "54 group" setup. (A group is three squadrons. Two to four groups make a wing. There are 17 wings in the US and five outside continental limits, making 22 in all.) The Air Corps occupies in the US about 105 air fields of its own, and ten in Alaska, Hawaii, Panama, etc.

Washington authorities don't believe any extraordinary port expansion plans will be brought before Congress.

Calling Names

Pan American Airways has new executive offices at 821 15th Street, Washington, D. C.

Richard E. Elwell, former attorney for Anthony Fokker and his company, is appointed chief attorney for compliance service of Civil Air Administrator.

American Airlines carried its 3,000,000th passenger. First in the world to do it.

Swedish Legation in Washington protests statements in AVIATION and other publications that their country is submissive to Germany. Sweden is arming to make a Nazi attack too expensive; wants more planes.

Pat O'Malley, CAA information assistant, on vacation in Central America, getting dope for an air hostess book.

Railway Express offers 27 airplane trips totaling 27,000 miles in a sales contest among its 57,000 employees. Grand prize is round trip anywhere to anywhere in the U. S., for two, and all expenses for a week.

Eva DeMariano serves as special dietician for TWA's 17 food service units between New York and California. Was with General Foods for ten years.

Alexander P. de Seversky was presented with the Harmon Trophy by President Roosevelt at the White House.

President W. A. Patterson of United Air Lines and **President J. C. Ward** of Fairchild Engine & Airplane Corp. were speakers at the January meeting of the Aero Club of N. Y.

C. B. Crone is appointed special representative, publicity department, to handle cooperative advertising for TWA, with headquarters in the Airlines Terminal Bldg., N. Y.

Dr. Hugh L. Dryden of National Bureau of Standards receives the Sylvanus Albert Reed Award from Institute of the Aero Sciences for contributions to the mechanics of boundary layer flow and to the interpretation of wind tunnel experiments.

Dr. Edward E. Minor, Jr., research and development engineer of Glenn Martin Co., is made chairman of the new Air Transportation Committee of the American Institute of Electrical Engineers.

John J. McCloy, World War Army captain, **Robert A. Lovett,** U.S.N.R. Lieutenant Commander in World War, and **J. H. Amberg,** attorney, are named special assistants to Secretary of War Stimson.

Guy Vaughan, Wright Aeronautical's president, presented 20-year service pins to 24 employees.

Elmer F. Bruhn receives appointment to Purdue University as associate professor of aeronautical engineering. Was with Vought-Sikorsky since 1935.

Selig Altschul, AVIATION's regular financial contributor becomes associated with Winthrop, Mitchell & Co. as independent consultant on transportation securities.

C. Harold Wills, in charge of Ford's Liberty engine production during World War, passed away on Dec. 30 at the age of 62.

Frank Mills, owner of Essington Aviation School and flight instructor during World War, died on Dec. 30 at the age of 48.

Capt. Garland Fulton retires from the Navy; was in charge of Airship Division, Bureau of Aeronautics since 1926.

Henry W. Roberts becomes Director of Public Relations for Lear Avia, at their New York City offices.

THE WASHINGTON WINDSOCK

By BLAINE STUBBLEFIELD

Jammed With Generals

A man told us, in the Willard Bar, that efficiency of skilled labor goes down as the certainty of not losing jobs goes up. We pass it along as the only point not yet debated as to the cause of slow airplane production.

The reason why Pan American Airways released three 314 Boeing boats to Britain is that this model will be obsolescent by the time it's delivered. PAA loses three months on the deal, but gains by substituting new designs.

If you didn't know it, Pan American's China National lines were grounded because of war, and now they're up again. The reason is, less combat in that region. Call it Japanese weakness if you like to.

If the U. S. joins war dance, airlines to South America will be jammed with brig. generals, diplomats with pointed mustaches, and guys with brief cases. Airlines would rather build routine trade to keep in peacetime. Some think War Department should lend transport planes to help U. S. foreign and domestic lines to haul war priorities.

One day recently the British bombed in daylight more than a dozen points in Europe from Norway to the East Mediteranean. Nazis have advantage of concentrated target, but they have enormous expanses to defend.

Glider and sailplane training will be increasingly advocated as a pilot backlog builder, if priorities (to save aluminum and engine man-hours), are placed against flivver planes.

Mrs. Roosevelt hopes when the war ends we shall "have the sense" to say there shall be no more armaments. This is the first word of what many think FDR intends to try: another League, this time with world police and no national armament.

Among the best adventure stories after the war will be the memoirs of pilots who are flying bombers over.

Rudy Arnold

NEW HAMMERHEAD PROPELLER, invented by Wm. H. Fletner, left, and Jim Sorena. Claim is that unusual tip design gives greater travel to the tip and also permits extreme end of prop. to get a full bite. Plane is said to travel inside a "tube" of still air. Here Fletner holds a conventional propeller alongside of new model. Inventors claim a 30 per cent increase in speed at same r.p.m.

Air Corps Expansion Program Completed 54 Combat Groups Have All Types of Planes

Washington (AVIATION BUREAU)—Expansion program for the Army Air Corps, as planned early in 1940 is moving ahead. On June 30, AC consisted of 3,322 Regular Army and Reserve officers, 1,894 flying cadets, and 45,914 enlisted men. At that time an Air Force of 54 combat groups containing all types of airplanes was the goal. There were then 16 skeleton groups and wings. In December, 1940, four Air District Headquarters were activated, together with 14 additional Wing Headquarters, which will handle the assignment of all personnel and planes in the 54-group setup. Groups not already activated, were installed on January 15, 1941, formed from existing Regular Army units. The Air Corps has expanded since last June to 6,180 officers, 7,000 flying cadets, and 83,000 enlisted men.

The complete personnel allotment under the 54-group setup is about 16,000 officers and 166,000 men. It is expected that by June 30, 1941, 10,100 officers, 15,000 flying cadets, and 151,000 enlisted men will be in the Air Corps.

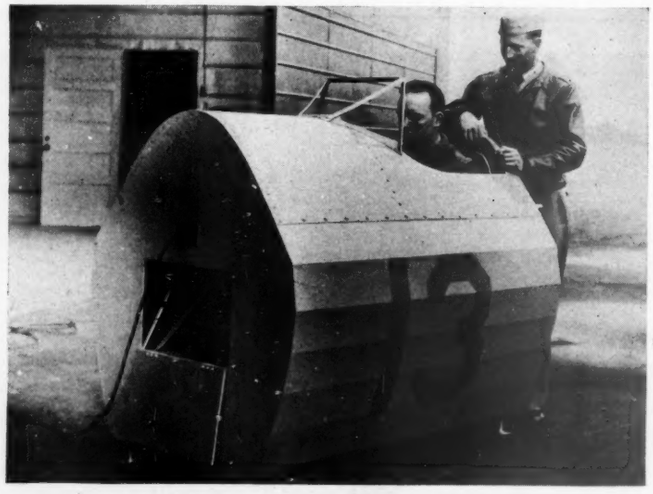
Decentralization of training and inspection duties of the Commanding General and GHQ Air Force is provided for, and the development of commanders and staffs for special task forces in time of war is assured.

Air District Headquarters: Mitchel Field, New York; Tampa, Florida; March Field, California; and Spokane, Washington. Wing headquarters, including those previously in existence, will be at the following places: Westover Field, Massachusetts; Mitchel Field, N. Y.; Selfridge Field, Michigan; Langley Field, Virginia; and Bowman Field, Kentucky; all in the Northeast Air District. Augusta, Georgia; Savannah, Georgia; West Palm Beach, Florida; Tampa, Florida; New Orleans, Louisiana; all in the Southeast Air District. Tucson, Arizona; Marsh Field, Fresno, and Hamilton Field, California; all in the Southwest Air District. Spokane, Washington; Portland, Oregon; Salt Lake City, Utah; all in the Northwest Air District. Air District Headquarters squadrons are given one officer and 63 men each and wing headquarters squadrons one officer and 25 men each to prepare for the arrival of complete headquarters.

The training of these new units will be under the direct charge of the Commanding General, GHQ Air Force, which comprises all four air districts.

Navy Needs More Planes and Pilots

As the high command divided the United States Navy into three fleets: Atlantic, Pacific, and Far East, Admiral John Towers, chief of the Navy air arm, told Congress the Navy expects to get 4,000 additional planes this year despite production delays. He said that on January 1 the Navy had 2,590 planes on hand. The additional 4,000 would run the total up to 6,590, but about 300 would have to be deducted for washouts and decommissionings. Admiral Tower said he believed delays in producing aircraft are due to shortage of machine tools and the failure of subcontractors to fulfill their obligations.



THIS IS A COORDINATOR. It reproduces the cockpit of an Air Corps Training plane, burns no gasoline. Thousands of AC cadets will begin aerial careers on it. Invented by H. G. Nicholson of Cal-Aero Academy.

Meanwhile Rep. Melvin J. Maas of the House Naval Affairs Committee says the Navy is short of training planes and candidates for flight training. He sees no hope for improved plane production unless priorities are given to planes over other armament. Shortage of pilot material is due to too high requirements, he believes. Mr. Maas sees no reason why service pilots must have two years of college training. He thinks more enlisted men should be trained as pilots, and will so recommend to Congress.

AC Wants Engineers

The Air Corps announced training of specialists for commissions in squadron engineering, armament, photographic and communications activities. Status, pay, allowances, will be the same as for cadets in pilot training. Applicants must be un-married, citizens, age 20 to 26 inclusive, excellent condition.

First choice for acceptance in engineering will be college graduates with engineering degrees; seniors in engineering will be second. Training, which will take about nine months, will include theoretical and practical engineering in civil and Air Corps schools. Subjects include: aerodynamics, airplane design; engines and installation; engine lab; stress analysis; instruments; propeller design; structure and aerodynamics of military planes. Engineering students will receive 12 weeks in either New York University or Purdue University. Fifty applicants enter each school every three months from January 1.

Armament and photographic schools will be at Lowry Field, Denver, and the communications school will be at Scott Field, Illinois. Requirements for these are a college degree together with some experience in the subject. Applications for communications, armament, and photographic are not being accepted as yet.

Pacific Air Fortress

So long as a strong Naval power exists in the Orient, Hawaii is one of the most strategic points in the Western Hemisphere. The United States is taking advantage of this fact by rushing work on 17 Army and Navy air bases in the area. These will constitute an almost impenetrable barrier to any hostile approach by sea or air. The bases are distributed among the Hawaiian Islands proper and adjacent groups.

"Live Bait"

Associated Press the other day reported that the U. S. Navy is using manned targets for bomb practice. The targets are average-sized motor boats with deck armor and a turret for a crew of two. A black stripe on the deck is the bull's eye for divers. Non-penetrating bombs are used, but the occupants said it was plenty exciting. The idea is that men aboard maneuver the boats in the manner of enemy craft attempting to evade the bombs. Target men and pilots exchange places for experience. The boats were seen on the way down the Mississippi.

Army Endurance Run

Few countries have the problem of such long-range defense flying as has the United States. Our Air Corps is by far the world's best in the art of military distance flying. A new test of equipment and men was made early last month when a Boeing B17c made a 15-hour flight at a minimum of 15,000 feet. The crew of six carried oxygen masks. Physical reaction to the long grind was specially watched. Distance covered was much in excess of 3,000 miles.

Anti-bomb Plans

It is surprising how few predictions you find as to the extent "civilization" will dig in to escape air bombing. Engineers say it costs so much to bury factories, hangars, and the like, that it may not be done extensively. Anyway, the defense agencies of this country are working out long-range plans based on British experience. These plans will be made available to local and state authorities. They include protection against fire, police and air warden duties, warning networks, shelter construction, wreckage removal, airfield and plant camouflage.

100 Octane Gasoline

Aviation gasoline is among the least of defense troubles, but the industry thinks it might be well to expand a little in case consumption by training planes and growing civil activities have been underestimated. The blockade abroad has reduced export of 100 octane gas by about 44%. If it were necessary to double present US production, it could be done in 12 months.

ROMEC *Expands*

FOR MORE AND BETTER AIRCRAFT FUEL PUMPS

The Romec Pump Company—pioneer manufacturers of aircraft fuel pumps—announce an addition larger than the original plant and the adoption of production and assembly methods that will triple capacity.

For years Romec Pumps have been used by the majority of the world's aircraft builders and operators. Whether in record breaking high altitude flights, steady daily transport service or on the famous round the world flights—Romec Pumps are there with that definite unquestioned dependability of operation. The new non-pulsating type reduces both wear and power requirement below any previous standard.

To aid in the Defense Program we are giving engineering consultation service on fueling problems on short notice, without charge. Your adoption of Romec Pumps now may save you difficulties and regrets.

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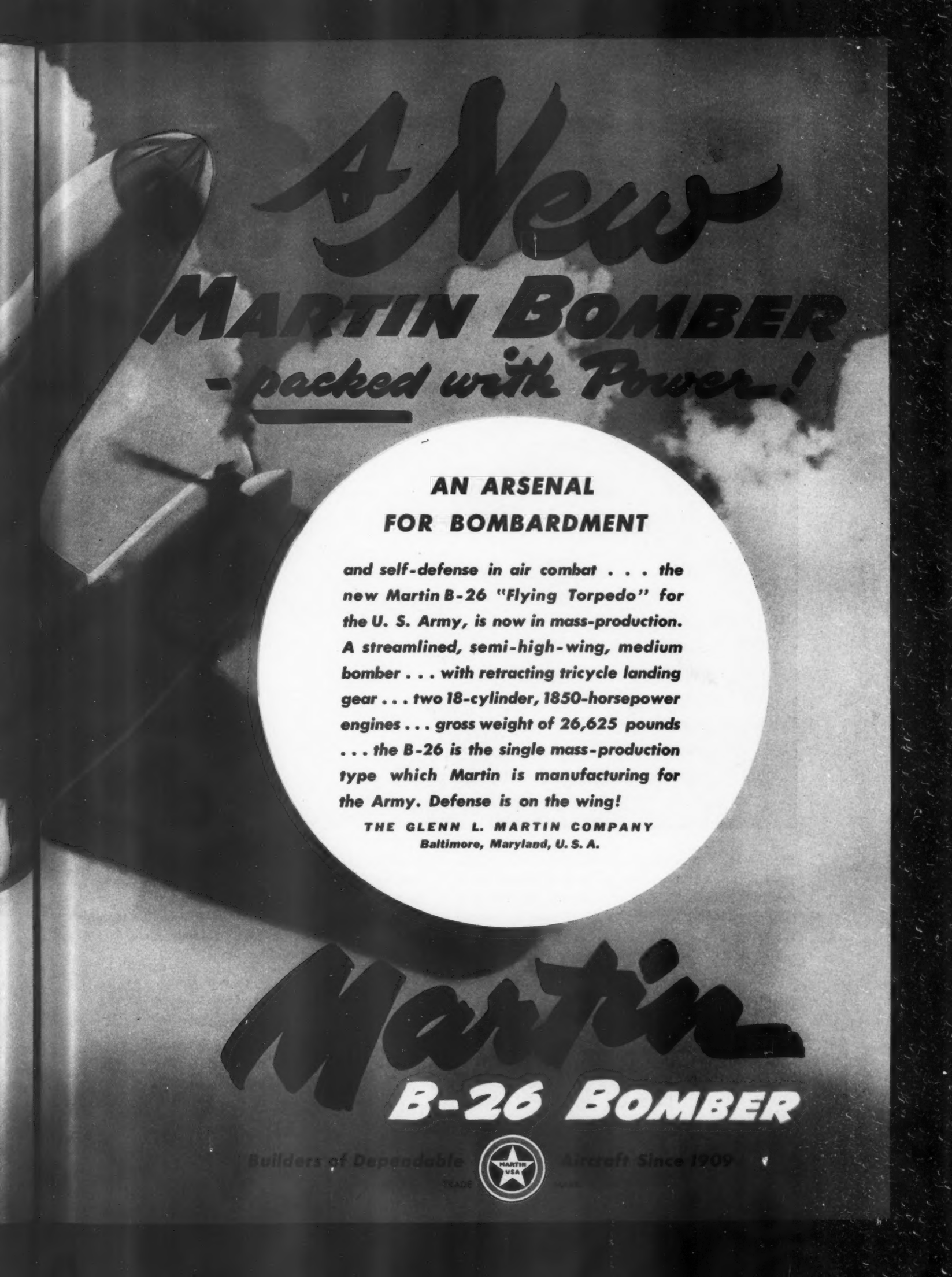
Engine driven, hand operated and electrically driven fuel pumps ★ emergency, hydraulic, vacuum and transfer pumps ★ Glycol, de-icing and bilge pumps ★ air compressors.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MARTIN BOMBER
-packed with Power-!
AN ARSENAL
FOR BOMBARDMENT
and self-defense in air combat . . . the new Martin B-26 "Flying Torpedo" for the U. S. Army, is now in mass-production. A streamlined, semi-high-wing, medium bomber . . . with retracting tricycle landing gear . . . two 18-cylinder, 1850-horsepower engines . . . gross weight of 26,625 pounds . . . the B-26 is the single mass-production type which Martin is manufacturing for the Army. Defense is on the wing!
THE GLENN L. MARTIN COMPANY
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Builders of Dependable Aircraft Since 1909
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Cost was no factor — Yet a low cost Molybdenum Steel proved the best. Such steels are worth investigating

High stresses and severe weight limitations make material specifications for airplane structural parts and fittings exceedingly strict — which explains why Chromium-Molybdenum (SAE X4130) steel is so extensively used.

This steel has an excellent strength-weight ratio and good fatigue strength. It is weldable by any process and welded parts can be used without subsequent heat treatment if necessary.

Write for our free publications, "Chromium-Molybdenum Steel for Aircraft" and "Molybdenum in Steel" for complete technical information.

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MEDIUM STAPLE — LIGHTWEIGHT AIRPLANE CLOTH

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Uniform from yard to yard, piece to piece and roll to roll. Uniform from day to day, month to month and year to year. Uniform in strength, in weight, in thread count, and in surface characteristics.

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Fort Erie, Ontario, Canada

United States Becomes Sole Plane Buyer

May Curtail Profit, But Simplify Production

Washington (AVIATION BUREAU):—Political effects of the arms-loan program are of course immense, but what it will mean to the man who builds the planes will take time to reveal. It will probably mean less profit; many manufacturers have felt that however US orders might be hedged with restriction there would always be a profit in the British work. Now the US is the sole customer.

On the other hand, production problems should be simplified by the standardization as between British and US requirements that is certain to result. Where a production line is already set up on models used only by the British, manufacture will doubtless continue. But where this country and Britain are ordering substantially the same ship, the loan plan should end bickering over details of fitting and equipment. Technicians of the two countries will continue to dispute over major questions of design such as armament versus performance or hydraulic versus electric turrets, but the British will be in a much weaker position.

Meanwhile, problems of manufacturers dealing with this government have been substantially reduced by the drastic reorganization of the defense set-up which followed the hesitations and fears of late 1940. Details of procurement and all technical matters remain in the hands of the Army and Navy, and on questions of production policy and methods, manufacturers are now able to deal, in the Office of Production Management, with men having authority and the power to make decisions.

With significant exceptions, personnel of the production division of OPM is about the same as that of the old production and materials divisions of the Defense Commission. Removal of Stettinius from the raw materials assignment should mean a lessening of the tendency in that group to play down possibilities of shortage and an increased emphasis on expanded sources of supply.

More sweeping is the shift in the priorities set-up. The system of "voluntary" preference ratings administered by the Army-Navy Munitions Board continued without hiatus through the reorganization period, as did the simplified system for extension of the ratings to sub-contracts with the mere countersignature of the inspecting officer in charge of the contract.

But the handling of compulsory priorities is now in the hands of the Priorities Division of OPM under Stettinius—with the advice of a Priorities Board including all the defense bigshots. Within a few hours after its organization, Priorities Division had set up its system of industry committees for every product on which there seemed an immediate prospect of shortage.

A program had been set up, just before the President reorganized defense, to make the voluntary priorities compulsory in all but name by arranging to issue a compulsory rating whenever cooperation is not obtained under a voluntary rating. Abolition of the old Priorities Board and the Priorities Administrator shelved that plan temporarily.

(*Continued from page* 141)

it. The foundry is intended to have a larger capacity than the factory—in order to help relieve the general shortage of magnesium castings.

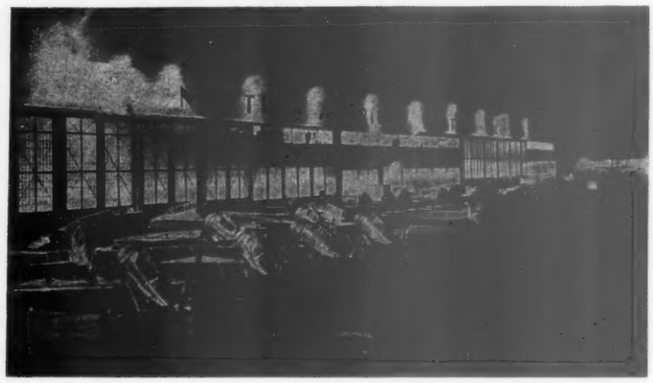
Another Pratt & Whitney factory is to be built by Buick in Grand Blanc Township, Mich., at a cost of $24,000,000. Studebaker is building $37,000,000 worth of plants for Wright engines at South Bend, Fort Wayne, and Chicago.

All of these plants are to be financed by the companies concerned. The cost will be repaid by the federal government over five years, after which title will vest in the government.

Liquid-cooled-aircraft engines are still exclusively an automotive industry product, though P & W is reported experimenting with this type. GM's Allison Division has pushed production to about 300 a month and is hoping for a 1,000 in the summer. Building construction for Packard's plant for Rolls Royce Merlin engines is nearly complete, and about a third of the machinery is installed. Some preliminary parts are being produced, but it will be the end of the year before any significant output is achieved.

Three or four liquid-cooled engines are on the Detroit drafting boards, though only Ford has officially announced he is working on the problem.

The Reuther (500-planes-a-day) plane is definitely shelved, at least for the present.



MORE ADVANCED TRAINERS for both U. S. and Britain are lined up at North American ready for flyaway delivery.

Assembly Lines

By Robert Colborn

A big factor in the plane production lag at the turn of the year — when output dropped twenty percent below the previous August—was that the industry was in something like an automotive model-change.

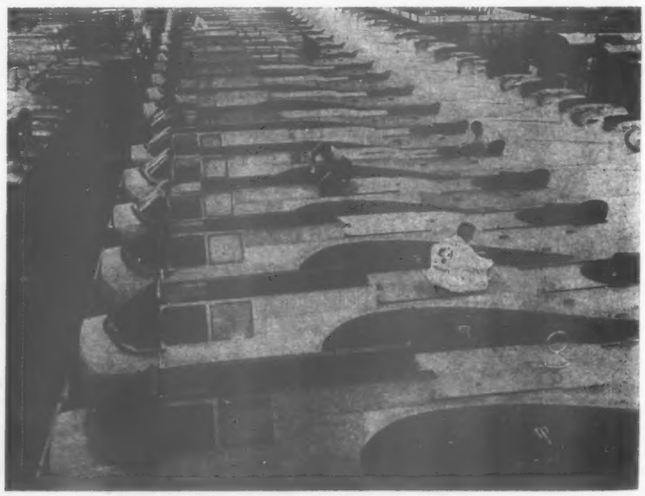
Martin has had to switch over from the French attack bomber, 167, to the Baltimore medium bomber for the British and the similar B-24 for Army. Moreover, the 100-ship a month assembly line for the French ships, idle since June is being started up on a somewhat modified design for the R.A.F.

Lockheed, too, which has attained an output of four Hudson bombers per day, is changing to a more advanced model of a design based on the Lodestar transport. Meanwhile, it is trying to get into production on the twin-engined pursuit, P-38E; lack of Allison engines, most of which are going into the Curtiss P-40, is a handicap.

North American is just putting the B-25 medium bomber into full production and is setting up a line for its pursuit ship.

Republic recently changed from the Swedish P-35 to a souped-up version, the Lancer, and will soon switch again to the even hotter P-44, the mass production job for the Army.

Shortage of magnesium castings and aluminum castings, forgings, and tubular products is



LONG ROWS OF ATTACK BOMBERS move along on tracks at the Douglas plant as airplane production moves into high gear. Douglas engineers have devised many new production short-cuts in recent months.

Aircraft Steels for Immediate Shipment

Large and Complete Ryerson Stocks assure Prompt Delivery

S.A.E. 1035—Medium Carbon Bars—H. R. and Cold Fin.
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W. D. X4130—Heat Treated Bars—Cold Fin.
S.A.E. 4140—Chrome-Molybdenum Bars—H. R. and Cold Fin.
S.A.E. X4340—Chrome Nickel Molybdenum Bars—H. R.
S.A.E. 4615—Nickel Molybdenum Carburizing Bars—H. R. and Cold Fin.
S.A.E. 4815—Nickel Molybdenum Carburizing Bars—H. R.
S.A.E. 52100—Chrome Bearing Bars—H. R.
S.A.E. 6145—Chrome Vanadium Bars—H. R.
Allegheny Stainless—18 Chrome-8 Nickel Corr. and Heat Resist. Steel-Bars and Sheets.
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Seamless Structural Tubing—Chrome Molybdenum S.A.E. X4130.
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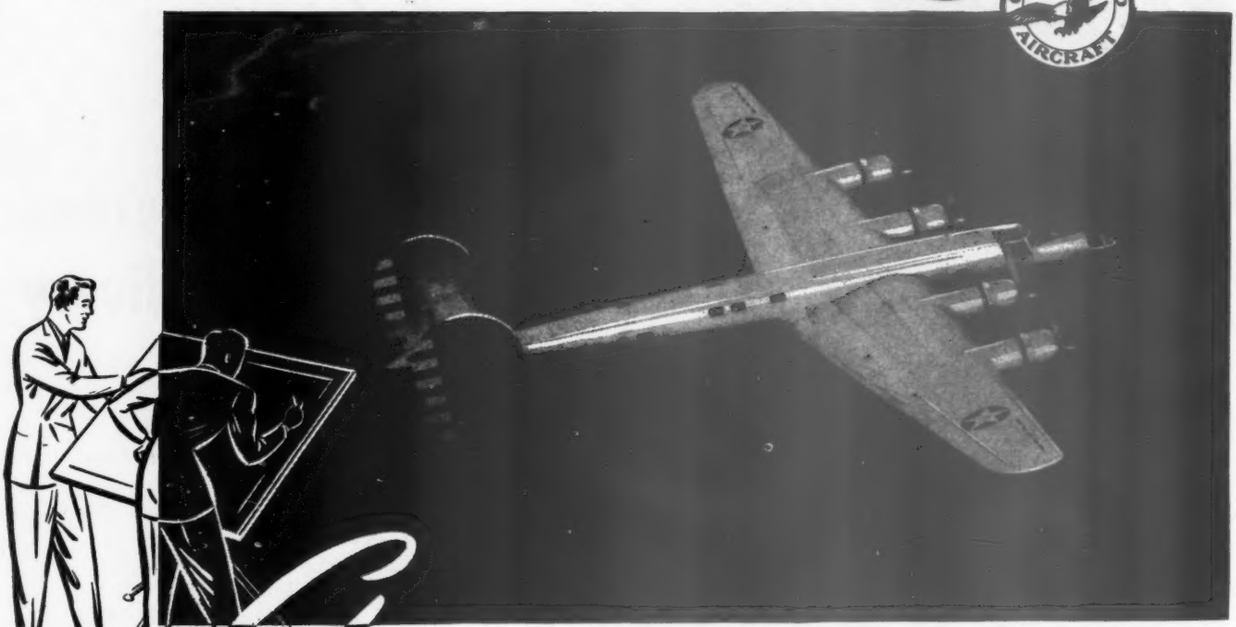
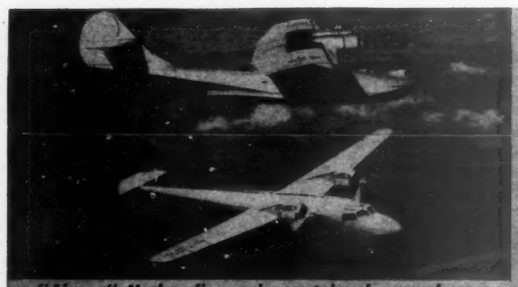


At work together....

ON THE HYDRAULIC SYSTEM OF CONSOLIDATED'S B-24

Thousands of hours were spent by the engineers of Aircraft Accessories Corp. in designing the specialized hydraulic units used in the Consolidated B-24 bombers. Much of this time was spent in collaboration with the engineers of Consolidated Aircraft Corporation—and both firms share the pride of this successful accomplishment.



"Airaco" Hydraulic equipment is also used on the Consolidated Amphibian Model 28, and Flying Boat Model 31.

Official U. S. Navy Photograph

The use of "Airaco" hydraulic actuating equipment in Consolidated B-24 bombers is the result of the development and research program continuously carried out by Aircraft Accessories Corp. "Airaco" engineers welcome the opportunity to aid manufacturers in the solution of their hydraulic problems, or to offer suggestions on the adaptation of hydraulic systems to their particular airplanes.

AIRACO

AIRCRAFT ACCESSORIES CORPORATION

166 W. OLIVE AVENUE • BURBANK, CALIFORNIA

WRIGHT AERONAUTICAL at Paterson, N. J., is now turning out a million horsepower a month in radial engines. This shows assembly of 1600-1700 hp. double-row Cyclones.

causing considerable embarrassment. In at least one engine plant the number of magnesium castings available is what determines engine output.

Supply of fabricated aluminum is tight, but defense officials think that by careful scheduling they can maintain plane production levels until new aluminum plants start operating this Spring. They are irritated when manufacturers cut production or complain to the newspapers in the face of material shortages without asking Washington for help; Northrop got a public reprimand for this.

Northrop is working on a single-engine patrol bomber, N-3, for the Norwegian air force (in Britain) and turning out one a week. Has 1,200-hp. Wright engine, 2,000-lb. bomb capacity and makes 235 mph.

Light plane builders are wondering whether they will be hit by the same restrictions that have been imposed on civil transports. Informal assurances come from Washington that they won't be forced out of business. But they are keeping a cautious eye on the Army and giving some thought to possible substitutes for aluminum sheet, of which they use a million pounds a year.

Consolidated facilities for manufacture of Navy patrol bombers are to be increased by $14,447,000 of plant; it will be built and owned by Defense Plant Corp., an RFC subsidiary and leased to Consolidated for ten years at a "nominal" rental.

Curtiss electric propellor capacity is to be increased by $14,000,000, probably to be government-financed on a five-year repayment "bankable contract." Curtiss has bought and will install machinery in the old Marmon plant at Indianapolis; the facilities at Caldwell, N. J., are to be expanded; and a new plant is to be built in Pittsburgh. Details have not been announced.

Ohio Crankshaft is to undertake a government-financed $4,000,000 expansion of facilities at Cleveland for manufacturing crankshafts for Wright engines.

Republic has started work on a new plant, several times as large as its present buildings, to cost $5,000,000. The new Farmingdale, N. Y., plant will provide most of the capacity for Republic's pursuit plane production.

Trans-ocean Ferry Man

Importance of the trans-oceanic ferrying of military aircraft for Britain is emphasized by appointment of Gilbert L. Givvin, as representative of the Air Service Department of the Canadian Pacific Railway Company, to act as liaison officer between West Coast aircraft builders and the Air Service Department of the Canadian Pacific. Wing Commander J. R. Addams, RAF agent in Southern California, appointed Givvin.

Air Scout Sprouts

The Boy Scouts have Sea Scouts so why not Air Scouts? New York headquarters is reported considering plans for establishing ground school and flight training, in conformity with CPTP standards, for scouts between ages fifteen and eighteen who can pass the government physical examination.

THREE GOOD REASONS
for using Elastic Stop Nuts on aircraft fastenings....

1. **Sound in principle.** A resilient non-metallic collar holds the threads of nut and bolt in a constant pressure-contact which can not be released by vibration, shock, or exposure to weather.

2. **Proved in service.** Now in their fourteenth year of successful use on aircraft, Elastic Stop Nuts have demonstrated their holding ability at every position... from instrument connections to wing fastenings... under all flying conditions.

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Catalog contains a graphic explanation of the Elastic Stop principle, presents test and application data, illustrates uses, and lists the complete line of nuts • Write for a copy.

ELASTIC STOP NUT CORPORATION
2320 VAUXHALL ROAD • UNION, NEW JERSEY

Elastic Stop SELF-LOCKING NUTS

Moderate Expansion of Airlines and Services Provided for, Says FDR in Budget Message

The airlines are considerably encouraged over the prospect of getting airplanes for maintenance and some expansion. The President, in his budget message to Congress, said that the air mail estimates are based on expected moderate increase of routes and services. Also, the Priorities executives of the Defense Commission, in cooperation with Army and Navy, has decided to let Douglas have engines to power the transports to be delivered—approximately half of what the airlines wanted. The original plan, to save engines for military purposes, was to lend engines which would fly planes to the purchasing airlines, remove and return them to be installed in military ships. The idea was that the airlines would have enough spare and alternate engines to fly the new equipment. But this didn't work out. Incidentally, under the present scheme, airlines are getting not only powered planes, but a few spare engines. Opinion in Washington is that the lines may do better than moderate expansion within a year or so.

Plane Location Recorder

An airplane location recorder which enables ground crews to determine the position of planes in flight has been perfected by United Air Lines. Work was directed by J. R. Cunningham, director of communications.

The recorder is the result of four years' research. Various scientific groups have tried for years to produce a unit which could be depended upon to function under all conditions.

It long has been possible to obtain position "fixes" in flight but heretofore it had been impractical to find direction from the ground while using the higher frequencies of two-way radio plane-ground telephone.

For the first time a dispatcher can follow the course of an airplane, and be aware of any deviation from course. This can be done without computations by the pilots, even without their knowledge.

A large frame antenna located atop a building is rotated by an electric motor. When a ship transmits by short-wave, the signal is received by the antenna. Equipment in electrical contact with this antenna automatically indicates the bearing of the plane on a chart. Thus, the dispatcher is able to keep a running record of the plane's flight.

Brazil Starts Line

Brazil is getting a new airline, financed and owned and operated by Brazilians. This is the first line in that country not dominated by outside interests. Terminals of the line, called Navegação Aérea Brasileira, will be Rio de Janeiro and Fortaleza in North Brazil. Major Orsini de Araujo Coriolano is technical director.

PAA Planes to Britain Ask Transocean Rates

Pan American Airways agreed to transfer to Britain three of their six new Boeing flying-boats which are nearing completion at Seattle. The transfer of course had to be approved by several US federal offices. England was in serious need of planes to maintain the essential lines of Empire communication. It is understood that Pan American has ordered twelve 76,000-pound 4-engined wheel planes from a West Coast manufacturer.

It is expected the Company will be ready to commence operation of six Atlantic round trips some time in July. The full schedule will not be flown unless traffic requires. PAA may start third and fourth round trips in April; fifth in May; sixth in June.

Rates asked of CAB for the service are $21,600 for the first two trips; for the third, $13,800; fourth, $9,000; fifth, $8,500; sixth, $8,000. The maximum outbound mail load is 1,600 pounds, plus $4 for each pound in excess of that.

All pilots, including Pan-Grace, are spending four hours a month under the hood of a Link Trainer. A special trade commission from Canada recently was good-willing around South America via PAA lines.

United Air Lines Flys Freight Trip

Freight service is operating on United Air Lines from New York to Chicago, one trip, late each evening. For some time the late trip has been departing in two sections, both carrying passengers, mail and express. The company simply puts all the passengers on one ship and the cargo on the other. Frequently the freight ship is so full that not even company personnel have been permitted to ride As yet, no certain ship has been stripped for freight. The seats are covered and cargo is stacked over them. When the ship reaches Chicago it is serviced and may go anywhere on the system with passengers. This one-a-day freight trip is not very important in itself, but from it the Company is gaining valuable experience which it will use later when the air system carries cargo in special planes. United is especially interested in cargo; has a staff of four, headed by Charley Graddick, putting all their time on building freight and express business. At present goods can go by air in only two ways: regular air mail rates, or regular air express rates.

CAB in Alaska

CAB recommendations for dealing with applications for route certificates in Alaska were made public December 17. The report does not include Pacific Alaska Airways, subsidiary of Pan American Airways, which now operates from Seattle to Ketchikan, Juneau, Fairbanks, Nome and Bethel, because this case has already been heard by examiners.

Hearings on applications from 39 carriers were held in Alaska. The cases stand for decision by the Board.

Air Transport Doings

Northeast Airlines announces a new direct air service between Boston and Moncton.

KLM West Indies Section, is resuming its service between Curacao and Trinidad and Trinidad and Paramaribo.

Mid-continent Airlines, Inc., gets a base rate of 34 cents per airplane mile for the first 300 pounds of mail or fraction thereof, plus 2.5 percent of such rate per mile for each additional 25 lbs. or fraction, on route 48.

United Airlines gets CAB approval of application to include mail service to and from Philadelphia on its New York-Oakland route.

Wide World

THE WORLD'S FIRST and only airline terminal building opened in New York January 9. It's at Park Avenue and 42nd Street, near Grand Central, biggest travel center in America.

AIR TRANSPORT INDICATOR

January 1, 1941

107.31

Which is the ratio of passenger-miles reported by the Air Transport Association for all domestic lines for December, 1940, to the figure for December, 1939. Total for the indicator has continued its slump from the year's peak. For the twelve months of 1940 traffic stood at 1,033,692,807, revenue passenger miles—up 7.3 per cent over November, 1939.

See Finance page for individual companies' traffic figures.

GREATER *Striking Power* FOR THE U. S. NAVY

Curtiss SB2C-1 Dive-Bomber

THE latest Curtiss SB2C-1 dive-bomber, most formidable of a type pioneered by Curtiss, will endow America's aircraft carriers with deadly striking power. With greatly increased speed, range, and armament, squadrons of these ships will play an important part in providing an airtight defense for the United States.

Powered with a 1700 H.P. Wright Cyclone 14, and equipped with a Curtiss Electric Propeller, the SB2C-1 has an exceptional reserve of power and range to extend the effectiveness of its scouting and bombing missions. Like all modern Curtiss airplanes for both the Army and Navy, it is designed for mass production—in one of the three great factories with which Curtiss is augmenting its present extensive facilities for National Defense.

CURTISS AEROPLANE DIVISION
Curtiss-Wright Corporation • Buffalo, New York

The Curtiss SB2C-1 dive-bomber carries its bomb load fully enclosed for greater performance.

Curtiss AIRCRAFT
FOR NATIONAL DEFENSE

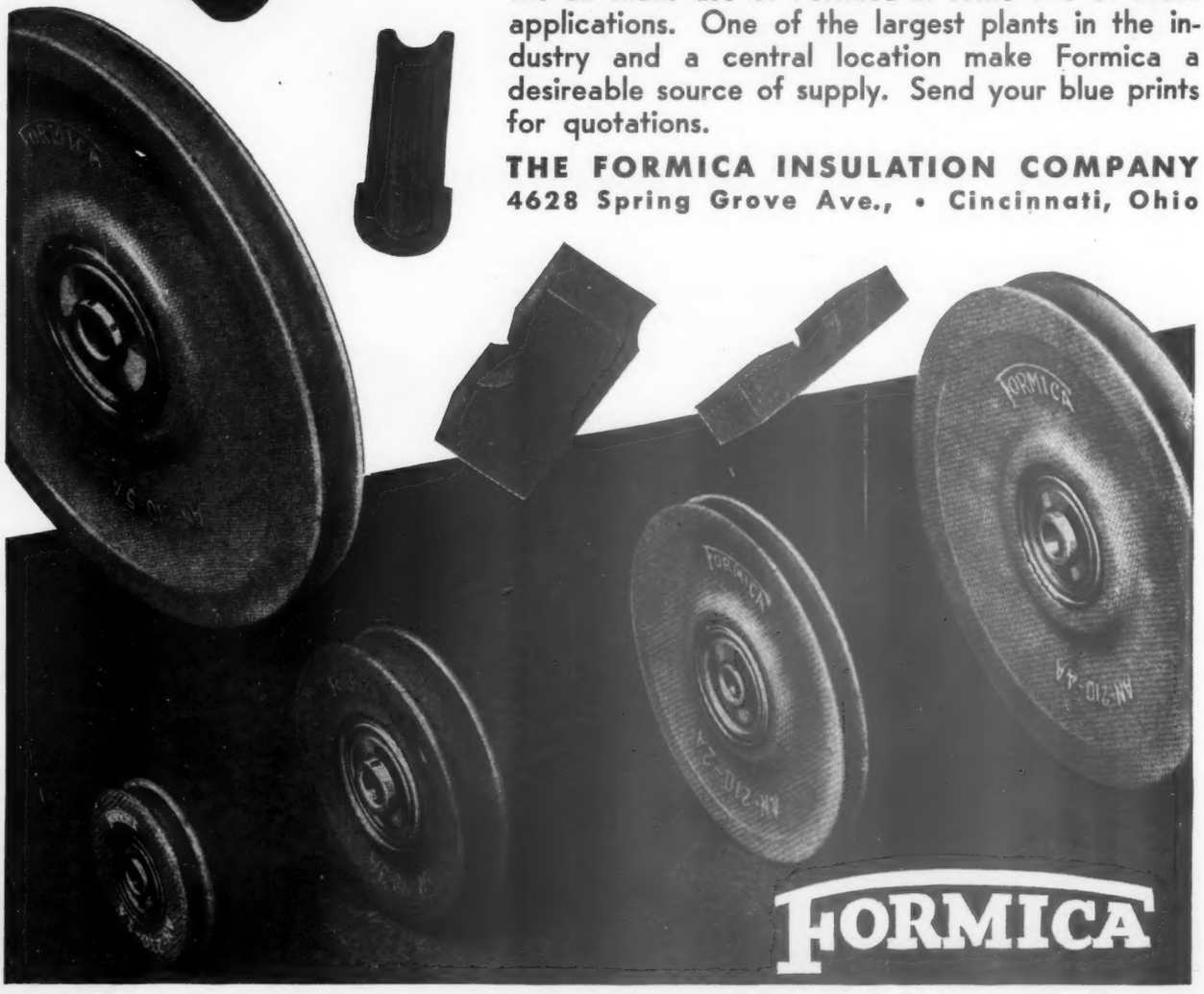
Control Pulleys and Machined Parts for Aeroplanes!

BECAUSE it is much lighter than aluminum, strong, stable in dimensions and free from corrosion of any kind the aviation industry has found Formica to be a valuable material for a growing number of parts on aeroplanes.

It is widely used for control pulleys, fair lead bushings, machined parts for propellers, insulation for electrical systems, panel boards for instruments of either the fluorescent or ordinary type.

A very large percentage of the new planes taking the air make use of Formica in some one of these applications. One of the largest plants in the industry and a central location make Formica a desireable source of supply. Send your blue prints for quotations.

THE FORMICA INSULATION COMPANY
4628 Spring Grove Ave., • Cincinnati, Ohio



HOW LIGHT PLANES AID PREPAREDNESS

Today — *right now* — America has more than 50,000 civilian pilots — pilots who received their essential primary training in *light planes.*

And hundreds of independent flying schools are training new thousands in *light planes* under the forward Civilian Pilot Training Program.

On the alert—this great army of civilian pilots is prepared to serve, within their capacity, in national catastrophes of floods, epidemics, *and defense.* Many are already in Army and Navy Air Corps — over 2600 CPTP graduates have enlisted and nearly 700 more are awaiting acceptance. Many others are building their flying experience in their own *light planes.*

Only with *light planes* can so many pilots receive primary training and multiply their experience so quickly. Only *light planes* can be built with the speed and in the quantity to provide adequate primary training facilities. The critical need for combat ships demands all large, fast plane production capacity. Existing industry capacity for *light planes* is now over 12,000 planes annually. Low in cost, inexpensive to operate, *light planes* fit the civilian pilot's pocketbook for training—and *keep* him in the air.

Serving our Nation's defense still further is the employment and training of many workers to replenish the serious shortage of skilled labor. *Light plane* manufacturers are conducting Vocational Training Classes — teaching metal trades, tool and die work, welding, painting, motor maintenance and repair, and other skills so urgently in demand.

Yes — the *light plane* is vital in National Defense. It is helping to create a Nation of Pilots — it is keeping them flying and ready for emergencies — it is expanding airplane plant capacity and increasing the supply of skilled workers. We are proud of the leading role Taylorcraft Airplanes are playing in this indispensible phase of national preparedness.

TAYLORCRAFT AVIATION CORPORATION
ALLIANCE, OHIO

TAYLORCRAFT

Opening Up

BOTTLE NECKS

Machines mounted on New Departure Ball Bearings run smoothly, work accurately, perform reliably because New Departure precision is built on a bed rock of Forged Steel. New Departure, a division of General Motors, Bristol, Connecticut. Detroit and Chicago.

NEW DEPARTURE

THE FORGED STEEL BEARING

2969

NACA Makes Annual Report

The 26th Annual Report of the National Advisory Committee for Aeronautics was transmitted to Congress by President Roosevelt on Jan. 13. Because of the restricted nature of a large share of the research which is now being done, this year's report contained less detailed information than in many years.

Most important developments during the year were the beginning of building the new Ames Aeronautical Laboratory at Moffett Field, Calif., and the voting of funds for the engine research laboratories at Cleveland. By the end of the coming year NACA will have three laboratories in operation rather than one.

During the year demands were made on the Committee by both Army and Navy for new basic data to improve aircraft performance. The great expansion in airplane production called for new quantity production methods. Both military services stepped up their experimental airplane programs.

The trend in aircraft development, the Report points out, was toward the development of planes having higher speeds and greatly increased armament. NACA made many experiments in its full-scale wind tunnel. Trends toward increased speed and higher ceiling, toward larger and heavier engines, more armor and armament, brought a need for larger and heavier types of airplanes. These conditions established a trend toward higher wing loadings.

The committee reported it had spent much time studying the subject of compressibility shock encountered at high speeds. With increased wing loading, the study of improved high-lift devices and lateral-control devices other than ailerons has been extended. High speeds bring many attendant problems which the Committee studied, such as improved cowling and cooling of engines, the design of wing ducts, and of ducts for cooling engine auxiliaries.

Scientists at NACA have devoted much time to the study of airplane design as related to increased production in factories. Close cooperation is maintained with both Army and Navy in this respect.

As an example of research that has been of great value, the report cites the example of a new type of cylinder finning that carries heat away from cylinder walls so rapidly that the horsepower of an engine can be tripled. It was stated that the power of the present air-cooled engines can be increased from 2,000 hp. to 6,000 hp.

Budget Estimates, 1942 For Aviation Interests

The President in his annual budget estimates that the Federal Government will need the following appropriations from Congress for expenses in connection with Aviation over the coming fiscal year beginning July 1, 1941:

Army Air Corps: $1,641,041,000 in cash plus $328,283,995 in contract authority, including $1,201,159,597 for 1941 aircraft contracts and $792,381 for contracts entered prior to July 1, 1939.

Navy Bureau of Aeronautics: $434,550,000 including $350,372,000 for construction of aircraft, $9,500,000 for continuing aviation development and $600,000 for travel costs including flight of new aircraft from plant to naval base.

Expediting production: $498,367,500 cash plus $195,867,500 contract authority to Secretary of War to speed production by constructing plants including aircraft plants. Of the above, $302,500,000 is to cover contracts authorized in fiscal 1941 appropriations.

Signal Corps: $49,131,644 for procurement of equipment and facilities including aircraft and radio supplies under fiscal 1941 contracts.

GEORGE ARENTS, JR., right receiving the Glenn H. Curtiss trophy from Carl Adams. George won the 10 lap race at the Miami Maneuvers in his Spartan plane at a speed of 172 m.p.h.

TWO WINNERS AT MIAMI. Miss Bobby Lupton exhibits the International trophy she won as women's acrobatic champion at the All-American Maneuvers. Jack Snodgrass of Waterloo, Iowa, has the Firestone Trophy which he won in a Taylorcraft.

Marine Corps: total estimate, $48,364,828.

Civil Aeronautics Administrator: $41,550,986 including $18,000,000 (reduction of $19,000,000 from last year) for CPTP; $14,236,000 ($2,827,776 increase) for maintenance of air navigation facilities; $525,752 for technical development; $2,769,860 for enforcement of safety regulations; $300,000, maintenance and operation of Washington National Airport; $4,719,700 ($2,636,580 reduction) for establishment of air navigation facilities. In addition, $33,500,000 was recommended for completion of the 250 airport development program. (To be augmented by WPA allotments.)

Civil Aeronautics Board: $1,208,275.

Domestic airmail: $21,280,327 (increase of $840,128 over last year for "moderate expansion").

Foreign airmail: $16,707,567 (increase of $460,418).

National Advisory Committee for Aeronautics: $4,567,890 (increase of $1,792,890) for research including operation of NACA laboratories, plus an additional $3,490,020 to continue construction of the Ames laboratory and $5,600,000 to continue work on the new engine laboratory at Cleveland.

Weather Bureau: $4,466,670 for weather aids to air navigation.

Coast Guard: $663,000 (to be available until June 30, 1943) for replacement and new airplanes and equipment.

Coast and Geodetic Survey: $182,000 for aeronautical chart projects.

Federal Bureau of Investigation: $8,750,000 (increase of $2,681,000) for investigations relating to defense.

Antitrust enforcement: $1,575,000 ($251,200 increase) for Thurman Arnold's division of Justice Department.

Miami Maneuvers

More than 1,000 private planes were flown to Miami for the All-American Maneuvers for the three days beginning Jan. 10. Pilots from all points east of the Rockies flew to Florida for the annual show.

Mike Murphy of Findley, Ohio, won permanent possession of the coveted Freddie Lund Trophy by winning it a third time, after an amazing series of aerial acrobatics. Squeek Burnett, of Richmond, Va., who won the trophy in 1939, was only contestant besides Murphy to reach the finals.

George Arents, Jr., of Greenwich, Conn., who owns and manages the Armonk Airport in Westchester County, won the 50-mile Glenn H. Curtiss trophy race. Arents flew his Spartan Executive. Julian O'Neal won an all-Miami 10-mile race in a Luscombe at 92 m.p.h. Jack Snodgrass of Waterloo, Iowa, won the finals of the Firestone trophy race. F. H. Stark, also of Waterloo, won second place.

Edna Kidd, of New Orleans, won the Alcazar trophy race from a field of women pilots. She flew a Culver Cadet at a speed of 119 m.p.h. Catherine Rawls Thompson, famous swimmer, won second place in a Culver Cadet. Third place was won by Virginia Snodgrass, of Waterloo, Iowa, in a Taylorcraft and fourth place to Arlene Davis of Detroit who flew an Ercoupe.

A 25-mile free-for-all sportsmen's race was won by Joe Dyer of Winston-Salem, N. C. who flew a Beachcraft. Ken Olson of Racine, Wis. was second.

Intercontinent Plant

Work is progressing rapidly on the new factory being built by the Intercontinent Corporation at the 36th Street Airport, Miami. The new plant will be used for the production of a primary military trainer and for general aircraft sub-contracting. It is hoped that actual production work will start this spring.

The factory will be composed of three units: the main factory building, the office and engineering section, and a separate section to house a foundry, paint and dope shop, and a hammer and press room.

Fighter escorts are used by British in bombing raids for the first time.

Air Corps is flying pilotless planes by radio control, but only within sight.

Transatlantic speed record set by Capt. Pat Eves of London, ferrying bomber; had breakfast in Canada, tea in London. Reports say ship was Lockheed Vega Ventura.

Grant Mason, CAB member, addressing Franklin Institute, Philadelphia, makes strong plea against curtailment of civil aviation in the emergency.

Edward T. Paxton is appointed manager, N. Y. office, PAA.

Piper Aircraft reported that 900 owners asked for free Gulf gas books for Florida trek.

How to get a job in Aviation is told by Charles S. Mattoon, personnel chief for Curtiss Aeroplane, in a new book.

All-American Aviation announces it will file with CAB for 7 air pickup routes covering 254 cities in New England.

Randolph C. Walker is elected chairman of board and president of Aircraft Accessories Corp. He has been influential in development of Vega Airplane Co., Menasco Mfg. Co., and Aircraft Accessories.

Commercial Aircraft Priorities Committee enlarged; includes Col. E. L. Lyons of Army; Col. Donald H. Conolly; and Merrill C. Meigs of Defense Commission.

AVIATION FINANCE

Although air travel in December showed the sharpest seasonal decline since 1937, traffic ran about 7 per cent ahead of the same month in 1939. And for the year as a whole, preliminary estimates indicate that the domestic air lines flew 1,043,000,000 revenue passenger miles, as against 677,000,000 in 1939. New peaks were established in earning power as well as in traffic, with the industry showing a profit of about $7,500,000 last year—an amount more than twice that reported in the best previous year of 1939. Large further gains are expected in commercial air travel again this year but with equipment expansion programs somewhat restricted by the priorities board of the defense commission, the increase may not run as high as the better than 50 per cent gain experienced in 1940.

Brewster and Continental Air Lines are raising new capital, the latter company having registered 100,000 shares of common stock with the SEC while Brewster has arranged to raise $600,000 by the private sale of 50,000 shares of capital stock. Hayes Mfg. Corp. of Grand Rapids, Michigan, also has registered 300,189 shares of common stock with the securities commission.

Curtiss-Wright has the largest backlog of unfilled orders among the aircraft manufacturers while Bendix Aviation ranks first in the parts and accessory field. A rough breakdown of the Curtiss-Wright backlog of $500,000,000 shows that approximately 53 per cent are for the army, 33 per cent foreign war orders, 9 per cent navy and 2 per cent for commercial air lines. Nearly 40 per cent of the Bendix backlog of $95,000,000, represents direct U. S. Government contracts.

Here And There . . . *Piper Aircraft* recently had a backlog of 540 planes . . . *Solar Aircraft* has been approved for listing on the N. Y. Curb . . . *Engineering & Research Corp.* is producing approximately 60 Ercoupes a month, with a backlog of about $1,000,000 on hand . . . *Douglas* payroll in 1940 totaled $28,100,000, against $14,300,000 in 1939 and with completion of its Long Branch factory will have 40,000 employes with a $70,000,000 payroll . . . During 1937, 1938 and 1939 *Bendix* expended $8,256,000 on engineering and research, an amount in excess of annual profits for that period . . . *Vultee* expects to produce 3,000 planes in 1941, as against 300 last year . . . *American Airlines* last December became the first domestic airline to carry 3,000,000 passengers . . . Air express shipments in 1940 reached the million mark for the first time . . . *United Aircraft* sales in 1940 totaled around $125,000,000, as compared with $52,000,000 the previous year . . . *Breeze Corp.* reported a $10,175,000 backlog of unfilled orders in December, 1940, as compared with $1,750,000 at the beginning of that year . . . Brewster is producing three planes a day and expects to double its output by fall . . . *Curtiss-Wright*, like its chief competitor, United Aircraft, had total sales deliveries of about $125,000,000 in 1940 . . . Earnings of *Continental Motors* for the quarter ended January 31, 1941, are estimated at $500,000, before federal taxes, in Wall Street circles . . . With sales estimated at around $10,000,000, as against $923,000 in 1939, *Republic Aviation* will report the first net profit in its history when the 1940 annual report is published . . . Gene Tunney recently purchased 1,000 shares of *Aviation & Transport Corp.*, while James S. Ogebury acquired 10,000 shares of *Fairchild Aviation Corp.*

By Raymond Hoadley

Government-financed plant expansion in the aircraft industry virtually will be completed towards the end of 1941 with peak production likely to follow early in 1942. Annual output at that time should be well past the two-billion-dollar mark as contrasted with estimated sales of $625,000,000 in 1940. Earnings this year bid fair to pass the high record established in 1940, unless, that is, Congress decides to increase sharply a tax burden that already has placed a speculative ceiling on the price of aircraft stocks. Because of the extra conservative charges that will be made against plant expansion, stockholders probably will receive a larger portion of remaining earnings than in past years. Meanwhile the commercial airlines are more worried over the procurement of adequate equipment facilities this year than they are over excess profits taxes—which in their case is substantially lighter than it is for the plane manufacturers.

Stainless steel is much talked of as a possible alternative to aluminum sheet if shortages get tighter or in the interest of easier mass production. North American's experiment with stainless on the wing and tail surfaces of BC-1 basic combat trainer rates considerable attention.

Furniture plant manufacture of parts is contemplated in the design of Fletcher Aviation Corp's plastic-bonded plywood trainer (primary or basic depending on hp.). A production test run of six planes is now in manufacture at Burbank.

Industry Backlog

Unfilled orders of the aircraft industry are well above $3,600,000,000, as against $700,000,000 a year ago, and are at a new high record despite accelerated deliveries recently to the United States and British governments. The Navy still has large aircraft awards to make out of the 1940 congressional authorizations and the Dutch East Indies currently are negotiating for planes. Meanwhile, plans are shaping up between the government and the aircraft and automobile industries with respect to an enlarged United States-British aircraft program. It is not expected that the motor industry will contribute heavily to aircraft production until 1942 and by that time the aircraft industry may be the largest employer of factory labor in this country. The following table gives the latest approximate unfilled orders of 23 primary producers of planes and aircraft engines. The Buick division of General Motors Corp. and the Studebaker Corp. are constructing large plants preparatory to substantial orders from the United States Government for aircraft engines.

Allison	$165,000,000
Aviation Corp.	15,000,000
Beech	22,000,000
Bell	60,000,000
Boeing	200,000,000
Brewster	109,000,000
Cessna	11,000,000
Consolidated	320,000,000
Continental	45,000,000
Curtiss-Wright	500,000,000
Douglas	350,000,000
Fairchild	20,000,000
Ford	122,000,000
Grumman	60,000,000
Lockheed	280,000,000
Martin	325,000,000
North American	212,000,000
Northrup	27,000,000
Packard	217,000,000
Republic	60,000,000
Ryan	11,000,000
United Aircraft	430,000,000
Vultee	91,000,000
	$3,652,000,000

Current Earnings Reports

Company					
Air Associates	12 mos. Sept. 30	$409,265	$126,939	$3.50	$1.08
Beech Aircraft	9 mos. Sept. 30	68,193	d91,478	0.17	....
Bendix Aviation	9 mos. Sept. 30	4,474,753	3,092,848	3.09	1.47
Cont'l. Motors	12 mos. Oct. 31	611,842	d215,164	0.20	....
Eastern Air Lines	9 mos. Sept. 30	792,221	456,840	1 41	0.81
Interstate Aircraft & Engineering Corp	6 mos. Oct. 31	38,352	15,603	....	....
Kinner Motors	4 mos. Aug. 31	336,507	.....	....	....
Taylorcraft	9 mos. Sept. 30	50,635	.....	0.31	....

*d—deficit

With the Airlines

Company	Revenue Passenger Miles* December 1940	December 1939	% Gain	12 Months 1940	12 Months 1939	% Gain	Revenue Passengers December 1940	December 1939	% Gain	12 Months 1940	12 Months 1939	% Gain
American	y21,930	20,672	06	x311,746	207,360	50	60,591	53,093	14	x870,930	541,757	60
Braniff	3,633	2,003	44	37,000	19,815	87	11,654	6,234	46	118,000	62,247	90
Chicago & Sthn.	1,070	922	13	16,076	9,242	74	2,554	2,237	14	41,875	23,353	79
Eastern	y13,500	9,124	48	x143,635	91,320	56	y31,000	21,894	42	x317,582	208,286	41
Northwest	y11,449	3,120	72	x59,787	34,749	73	5,934	6,901	—	x111,608	67,618	50
Penn. Central	2,362	1,835	28	37,579	21,193	77	12,262	10,550	13	210,436	122,303	72
T.W.A.	y12,136	9,011	25	x145,519	90,169	37	y24,182	19,120	26	x297,305	181,076	64
United	15,823	12,151	23	226,000	146,000	52	y32,659	y24,099	35	x419,996	262,135	37

*000 omitted y—November x—11 months.

Recent Awards

War Department

Glenn L. Martin Co., Baltimore, Md., $892,012 for maintenance parts for airplanes.

Fairchild Aviation Corp., Jamaica, N. Y., $8,019,845 for cameras, cone and magazine assemblies.

Curtiss-Wright Corp., Clifton, N. J., $63,202,820 for propeller assemblies and control sets.

Link Aviation Devices, Inc., Binghamton, N. Y., $4,097,412 for link trainers.

Irving Subway Crating Co., Long Island City, N. Y., $203,845 for airplane landing mat and tools.

Allison Engineering Co., Indianapolis, Ind., $69,722,625 for airplane engines.

Armstrong Brothers Tool Co., Chicago, Ill., $167,485 for socket wrenches and parts.

Weston Electrical Instrument Co., Newark, N. J., $110,728 for ammeter and voltmeter assemblies.

Weston Elec. Instrument Co., Newark, N. J., $363,965 for indicator and generator tachometers.

Navy Department

Grumman Aircraft Engineering Corp., Bethpage, N. Y., $30,275,805 for airplanes and parts.

Grumman Aircraft Engineering Corp., Bethpage, N. Y., $5,974,650 for airplanes.

Window Shopping

The following literature will be sent to any reader on request direct to the firm mentioned:

Precision products—A line of precision products, including switches, resistors, condensers, volume controls and similar items is described in the new bulletin issued by P. R. Mallory & Co. of Indianapolis. Form M-770-A, 40 pages, 8½ x 11 in.

The Abrams Contour Finder—Pamphlet illustrating and describing Abrams stereoscopic contour finder for use in connection with aerial mapping. Abrams Instrument Co., Lansing, Mich.

Allis-Chalmers HD-7—A 24-page two-color catalog describing the Allis-Chalmers 54-hp. crawler type tractor. Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

Lynite Lo-Ex Aluminum Pistons and Cylinder Heads—A 44-page book dealing with aluminum alloy pistons and cylinder heads. Aluminum Company of America, Pittsburgh, Pa.

Anaconda Metals in the Aircraft Industry—A handsome 18-page manual of copper and copper alloy stock materials currently used in aircraft and aircraft engine manufacture. The American Brass Co., Waterbury, Conn.

American Bonded Metals—A series of five folders dealing with various types of nickeled parts. American Nickeloid Co., Peru, Ill.

Bacharach Type 2-CP Engine Indicator—Bulletin 279, Bacharach engine indicator Type 4-HS—Bulletin 281. These bulletins describe high-speed engine indicator equipment. Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh, Pa.

Chemical Folder Group No. 2 on "Glycols"—Covers characteristics of liquid coolants and other glycol compounds. Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y.

Despatch Finish Baking and Drying Ovens—A 12-page catalog dealing with lacquer and enamel baking equipment. Despatch Oven Co., Minneapolis, Minn.

DuPont Plastics Bulletin No. 7—An interesting folder, punched for loose-leaf binding, dealing with recent applications of molded plastics. Plastics Department, E. I. duPont de Nemours & Co., Inc., Arlington, N. J.

Pneumix Agitators—A 4-page folder describing air motor equipment for mixing lacquers and paints. Eclipse Air Brush Co., Inc., 390 Park Ave., Newark, N. J.

War machines and munitions have to be good to stand up under war conditions. They must be made rapidly in huge quantities by a variety of plants. All parts must be strictly interchangeable.

Hence the task of guarding quality becomes a matter of life and death importance to a nation rearming to preserve its liberty.

Sheffield Visual Gages are stalwart guardians of dimensional quality. They are used in checking dimensions of manufactured and purchased parts, tools, production and master gages.

The sturdy Reed Mechanism, combined with the light beam lever arm, provides a sensitivity to meet the highest precision standards of measurement—but without the delicate fragility so often associated with sensitivity.

These gages are not delicate, they are strong and deadly accurate. They are made in various models to check accurately to thousandths, "tenths" or millionths of an inch and all provide rapid, easy gaging to any limits required on production work.

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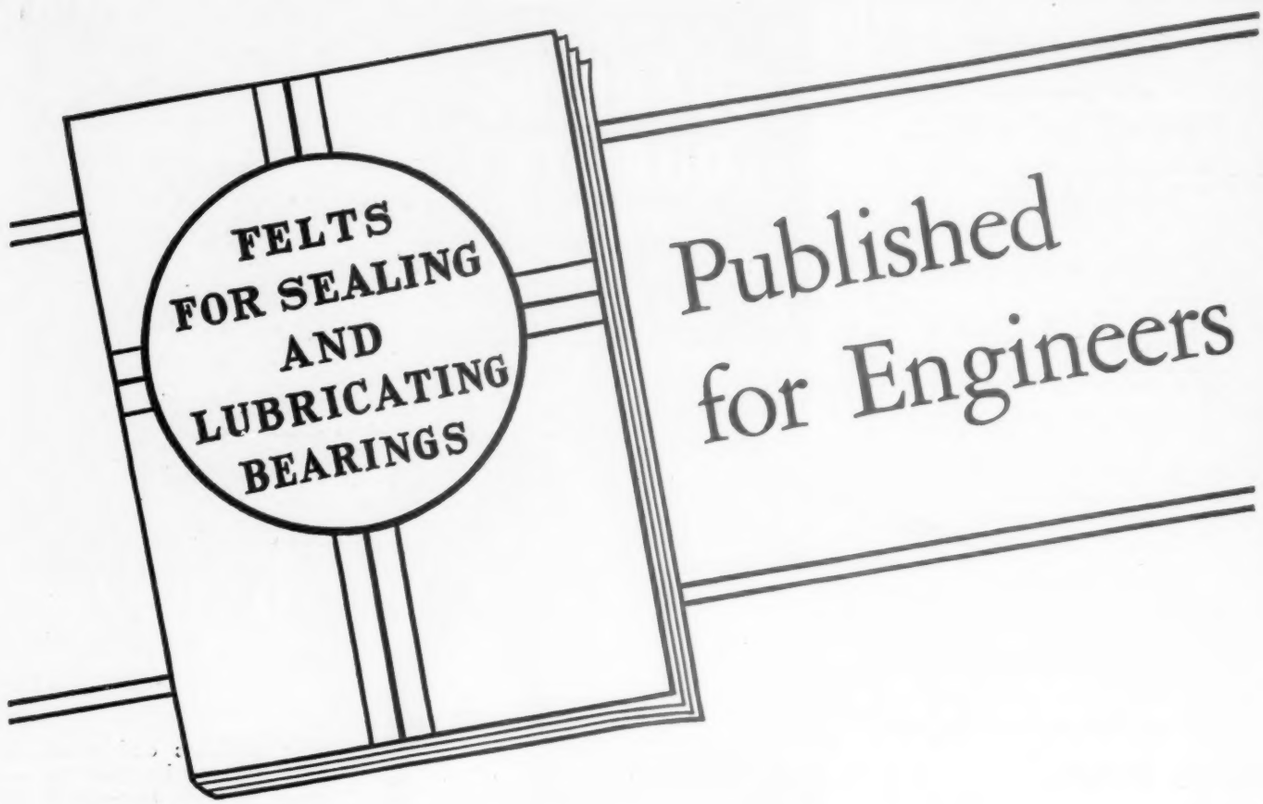

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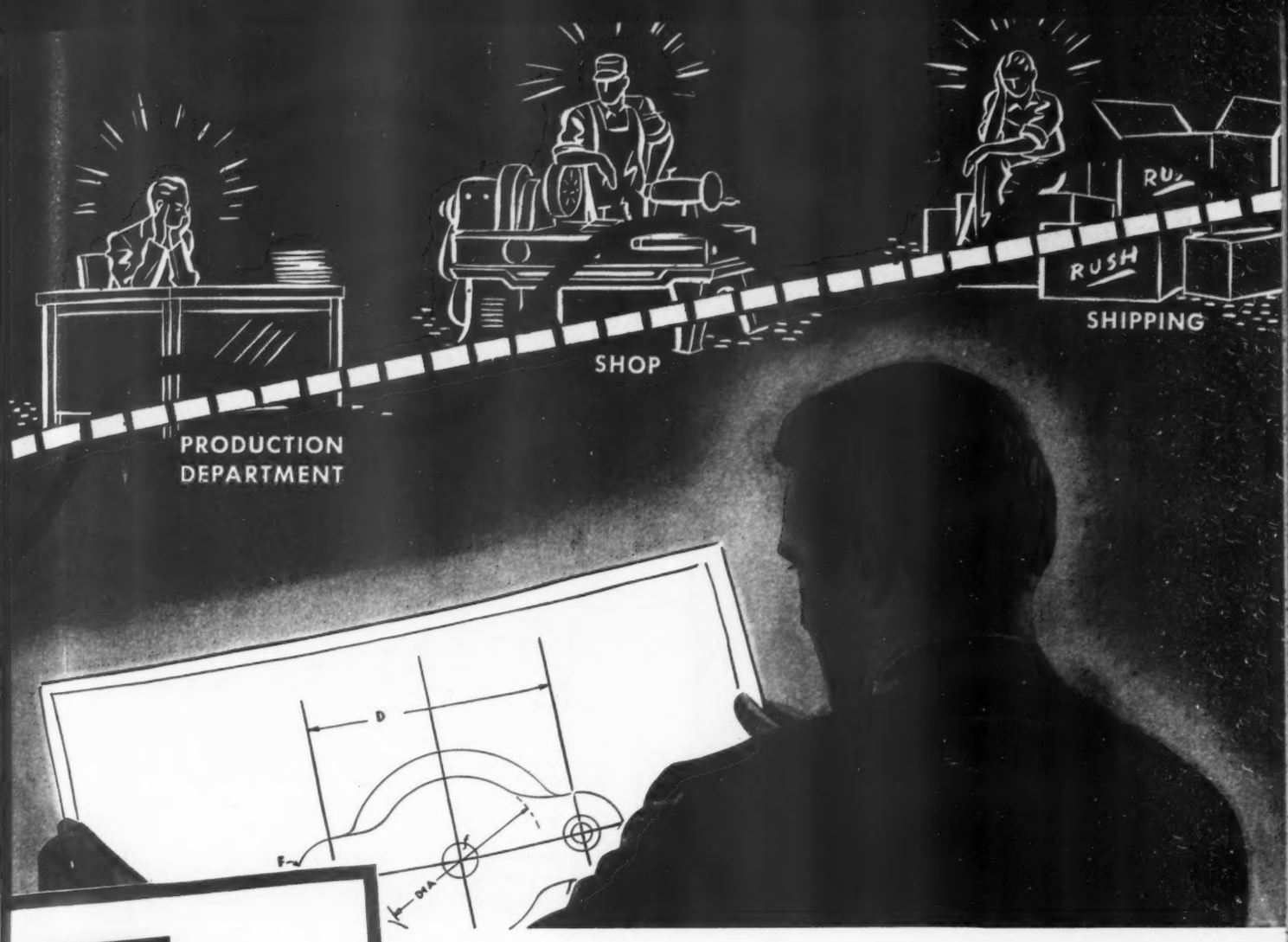

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Even in these times of war, Pan American Airways continues to hold the American flag high in the air—plans have been made public recently that three new extensions can be expected in the near future, linking vital points of the British Empire and providing an improved Trans-Atlantic service. The new routes are (1) a Southern Atlantic service via Bolama (Portuguese West Africa), Port of Spain and San Juan to New York; (2) a line to Capetown via the West Coast of Africa and (3) extension of the Trans-Pacific route to Singapore.

Of these new lines, those to Singapore and Capetown vie with each other in importance. The service to Singapore, reliably reported to be in answer to State Department wishes, will form a link with the extensive British and Dutch airnets in the Far East, India and Australia. In addition, it will eliminate complications which might arise if the Dutch were granted their long-sought-after permission to fly into Manila, while the Japan Air Transport Company did not receive this privilege. By this move, the necessity of a direct connection between Manila and Batavia has been completely eliminated, and it seems improbable that further action will be taken in this matter.

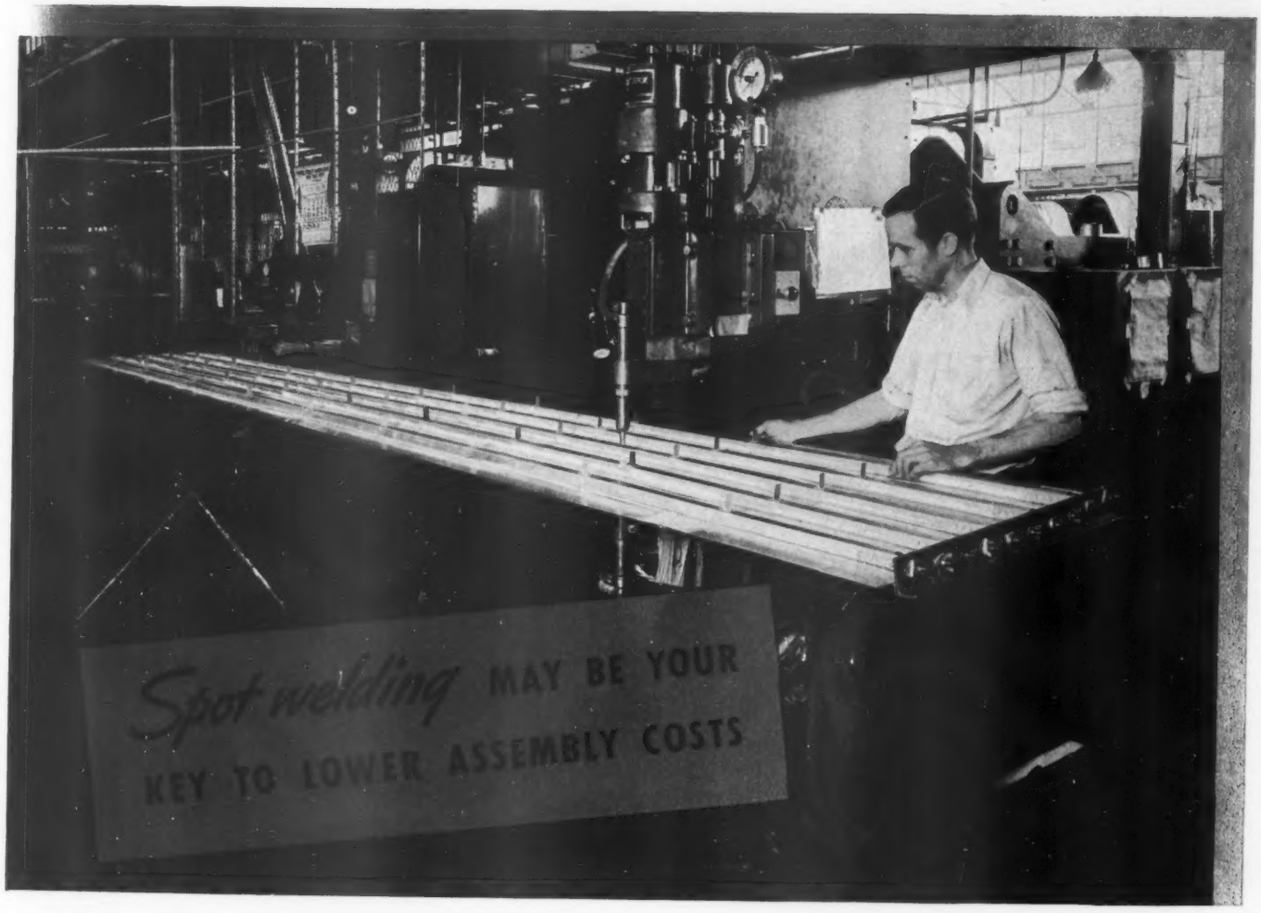
Singapore, already an important link in the international airline system, will gain in importance when it becomes a terminal for P.A.A.'s Pacific service. Actually, these plans are of prime interest to both the East Indies and India; Australia is already directly served by the line to New Zealand, from where Tasman Empire Airways and other Australian lines give through connections to all important cities on the Sixth continent.

From Capetown, where the new line to South Africa will have its terminal, most of East Africa, the Near East and India will be served by British Overseas Airways, thus opening faster connections to and from the Western hemisphere. At the same time, an alternate route to England will become available via Egypt, from where there now is a regular, but unpublished airline to the British capital. Actually, the plans for an airline down the West Coast of Africa are not new; in 1938 plans were completed for a joint service by British Airways and the Holland K.L.M., and the latter made several survey flights with passengers to Capetown.

The service over the Southern Atlantic, which for the time being will only be flown in Westerly direction, will circumvent the trouble at Horta, where the sea is all too often too rough to permit the heavily laden Clippers to take off. Recent survey flights were made between New York and San Juan, while further tests between Trinidad and Bolama will undoubtedly follow shortly, as soon as the equipment is available and base facilities have been completed.

The disruption of the Atlantic services by sea conditions has been quite noticeable during recent months—the release of three of the new Boeing 314As to Britain did not come as a surprise, and further emphasizes the trend away from large flying-boats. This trend was heralded quite some time ago by the announcement of a 9-hr. landplane service to Honolulu, was further stressed by replacing the old Clipperships in South America by DC-3s and the new service to Buenos Aires with Stratoclippers, and will shortly again break into the headlines when the purchase of about a dozen large landplanes in the 80,000 pound class is announced.

The airport at Lisbon was developed with an eye on Trans-Atlantic landplane service; another large airport is available on the Island Sal in the Cape Verde Group, while there are any number of airports in the United States and Latin America which are suitable for 40-ton landplanes, including the reported airport development at Bermuda.



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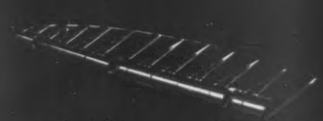

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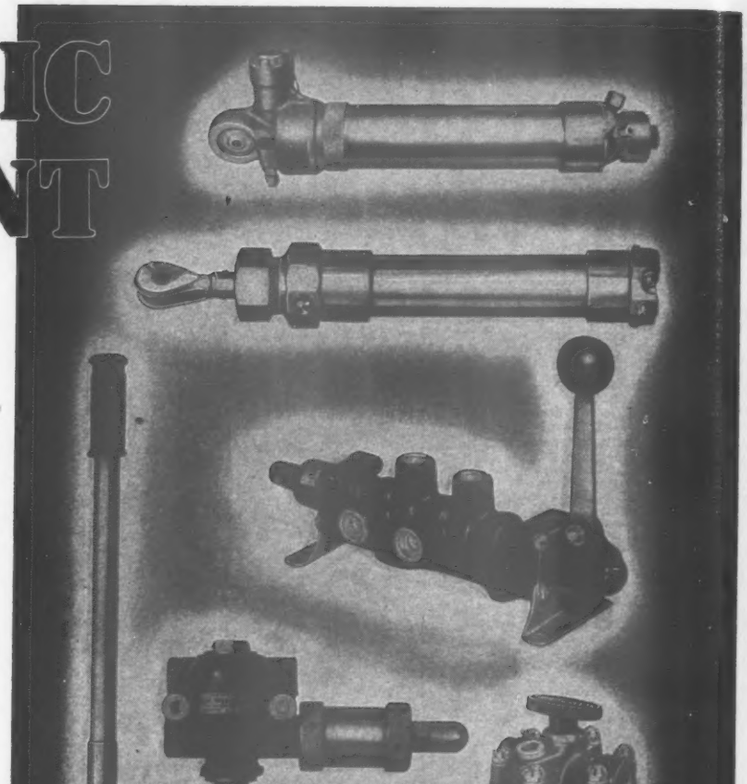

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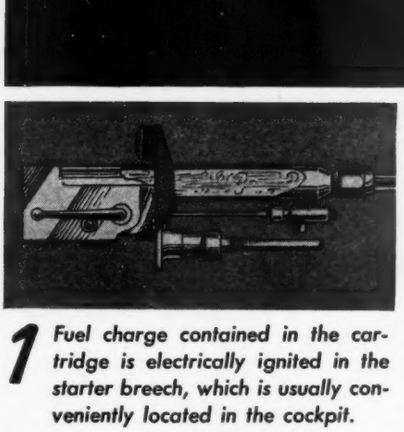
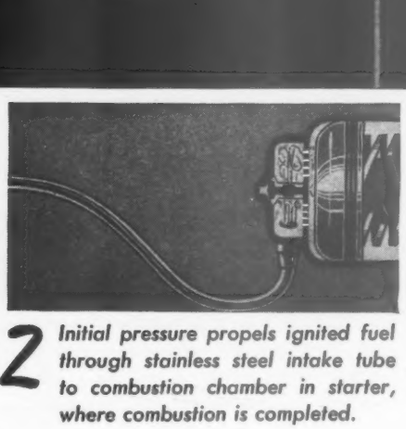
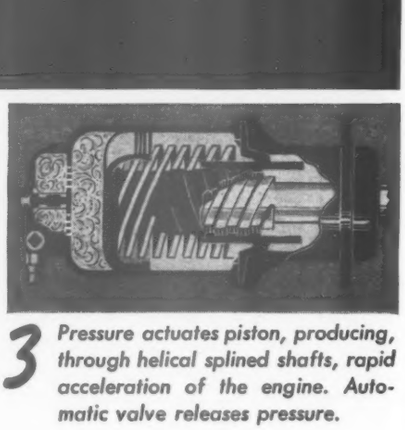


1 Fuel charge contained in the cartridge is electrically ignited in the starter breech, which is usually conveniently located in the cockpit.



2 Initial pressure propels ignited fuel through stainless steel intake tube to combustion chamber in starter, where combustion is completed.



3 Pressure actuates piston, producing, through helical splined shafts, rapid acceleration of the engine. Automatic valve releases pressure.

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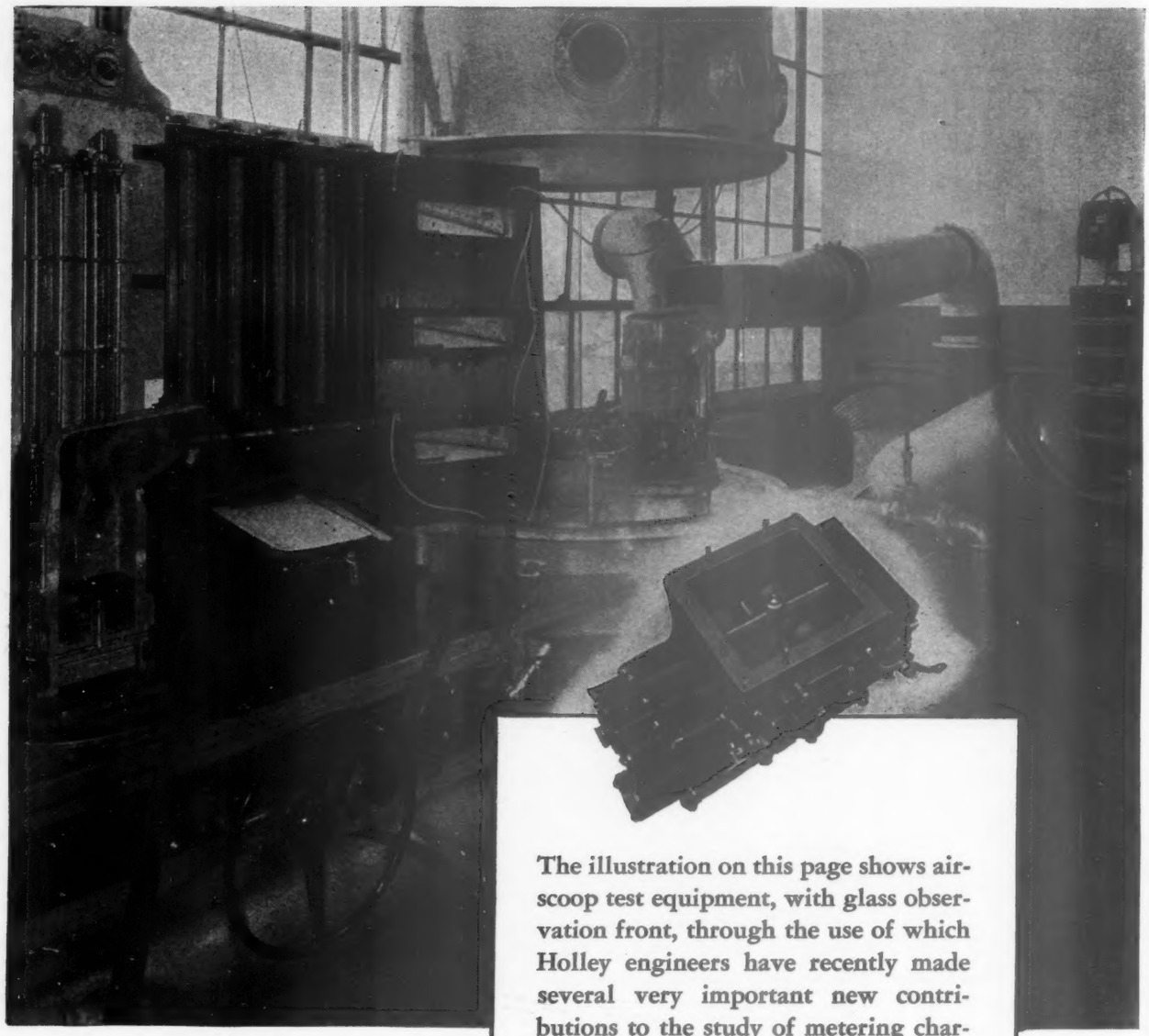

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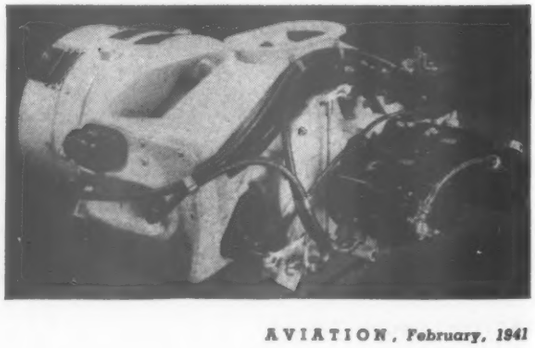

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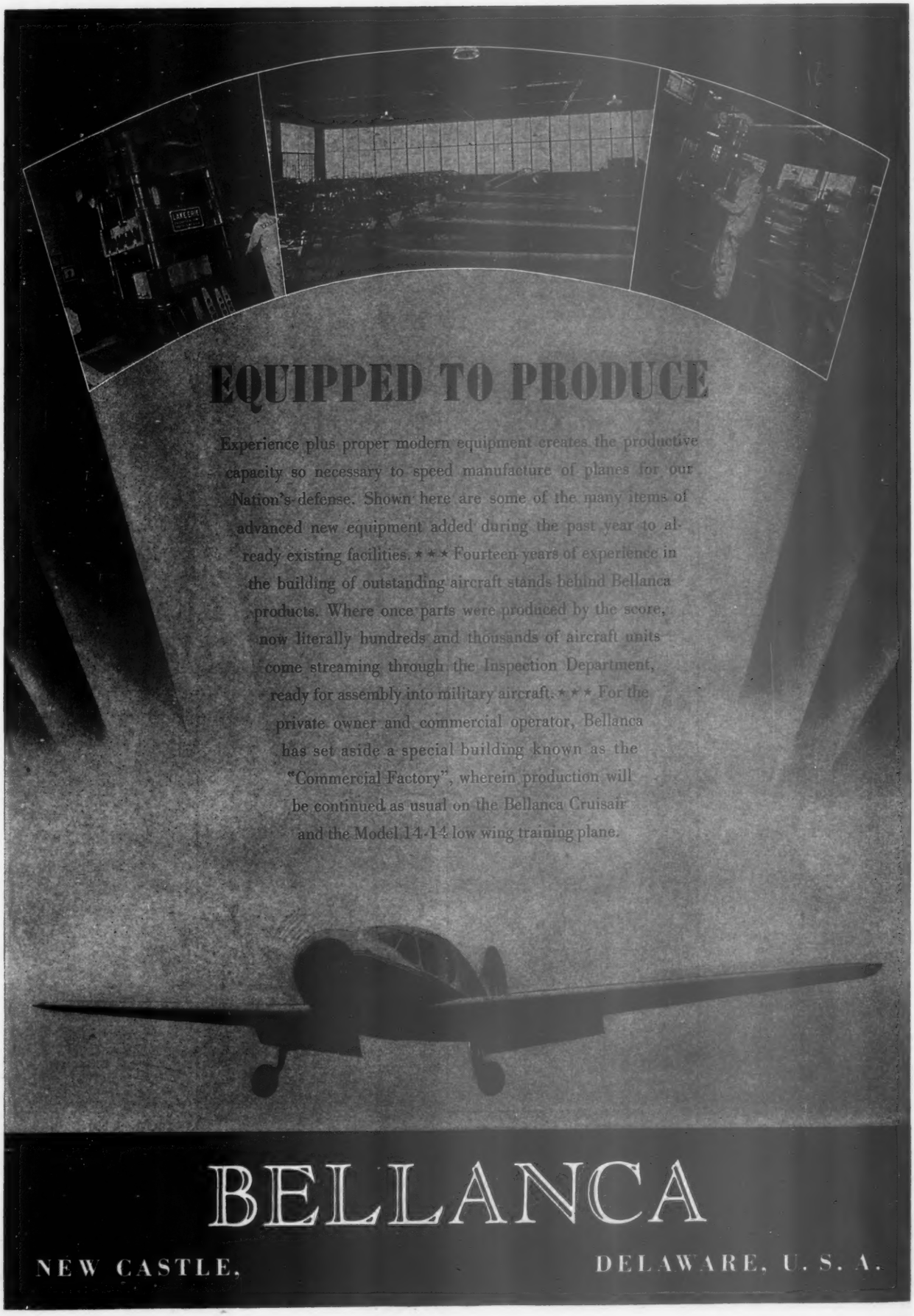
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Jones, Casey, School of Aeronautics, Inc., 534 Broad St., Newark, N. J.

Kirk's Airmotive, Box 294, Anchorage, Alaska

Krantz Aeronautical Service, Port Erie Airport, Erie, Pa.

Lackey's Aircraft Sales & Service, R. R. 1, Box 209, New Augusta, Ind.

Lange Aviation Corp., P. O. Box 1098, Milwaukee, Wis.

Leech Aircraft, Inc., Roosevelt Field, Mineola, L. I., N. Y.

Lincoln Airplane & Flying School, 2415 "O" St., Lincoln, Neb.

Link Aeronautical Corp., Tri-Cities Airport, Endicott, N. Y.

Lockheed Aircraft Corp., 1705 Victory Pl., Burbank, Calif.

Long Airmotive, Inc., Ltd., San Francisco Bay Airdrome, Alameda, Calif.

Louisville Flying Service, Inc., Bowman Field, Louisville, Ky.

Manhattan High School of Aviation Trades, 220 E. 63rd St., New York, N. Y.

Marston Flying Service, Concord Airport, Concord, N. H.

Mattern, Jimmie, Aircraft Corp., Allegheny County Airport, Pittsburgh, Pa.

Mercury Aircraft, Inc., Wheeler Ave., Hammondsport, N. Y.

Metal Aircraft Welding Co., Building 29, Roosevelt Field, Mineola, L. I., N. Y.

Meyer Flying Service, 919 Oakland St., Hendersonville, N. C.

Mid-Continent Airlines, Inc., Municipal Airport, Kansas City, Mo.

Mid-West Aviation Corp., Norton Field, Columbus, Ohio

Missouri Aviation Institute, Div. of Bredouw Aeromotive Corp., 334 Richard Rd., Kansas City, Mo.

Muncie Aviation Corp., Center Pike, Muncie, Ind.

Moran, Dan E., 5150 Telegraph Rd., Los Angeles, Calif.

National Airlines, Inc., Albert Whitted Airport, St. Petersburg, Fla.

Nelson Flying Service, Inc., Ontario Airport, Ontario, Calif.

Newark Air Service, Inc., Newark Airport, Newark, N. J.

New England Aircraft School, Inc., Boston Airport, E. Boston, Mass.

New York State Aviation Repair Station, Union St. School, 823 Union St., Utica, N. Y.

North American Aviation, Inc., 5701 Imperial Highway, Inglewood, Calif.

North Dakota State School of Science, Wahpeton, N. Dak.

Northeast Airways, Inc., Portland City Airport, Portland, Me.

Northwest Air Service, Inc., Boeing Field, Seattle, Wash.

Oakies Airmotive Company, 1212 St. James Ave., Springfield, Mass.

Pacific Airmotive, Division of Airplane Mfg. & Supply Corp., Union Air Terminal, Burbank, Calif.

Pacific Airmotive, San Francisco Airport, S. San Francisco, Calif.

Pacific Alaska Airways, Inc., Fairbanks, Alaska

Pacific Scientific Co., Inc., 1206 Maple Ave., Room 160, Los Angeles, Calif.

Pacific Scientific Co., 25 Stillman St., San Francisco, Calif.

Palo Alto Airport, Inc., Box 640, Palo Alto, Calif.

Pan American Airways System, Santos Dumont Airport, Rio De Janeiro, Caixa Postal 694, Brazil, S. America

Pan American Airways Co., Treasure Is., San Francisco, Calif.

Pan American Airways, Inc., France Field, Panama Canal Zone

Pan American Airways, Inc., Post Office Box 3311, Miami, Fa.

Pan American Airways Co., Municipal Airport, Baltimore, Md.

Pan American Airways, Inc., Brownsville Airport, Brownsville, Tex.

Pan American-Grace Airways, Inc., Limatambo Airport, Castilla 2488, Lima, Peru, So. Amer.

Parks Air College, Inc., Parks Airport, E. St. Louis, Ill.

Pathfinder Flying Service, Municipal Airport, Stockton, Calif.

Pennsylvania-Central Airline Corp., Detroit City Airport, Detroit, Mich.

Pennsylvania-Central Airlines Corp., Allegheny County Airport, Pittsburgh, Pa.

Pester's Propeller Service, Inc., Roosevelt Field, Mineola, L. I., N. Y.

Pester's Propeller Shop, Glendale, Calif.

Pioneer Aircraft Company, Flushing Airport, Flushing, L. I., N. Y.

Plane-Owners-Service, Inc., Roosevelt Field, Mineola, L. I., N. Y.

Pollack Flying Service, 203 Lacy, Fairbanks, Alaska

Poorman Aircraft Service, McKinley Airport, Canton, Ohio

Portland Flying Service, Inc., Municipal Airport, Portland, Me.

Precision Aeromotive Corp., Municipal Airport, Houston, Tex.

Propeller Service & Repair Co., 2856 S. 27th St., Milwaukee, Wis.

Queen City Flying Service, Inc., Hangar 3, Lunken Airport, Cincinnati, Ohio

Reading Aero Service, Municipal Airport, Reading, Pa.

Reliable Flying Service, Inc., P. O. Box 1303, Briston, Conn.

Robertson Aircraft Corp., Lambert-St. Louis Municipal Airport, Robertson, Mo.

Ronan and Kunzl, Brooksfield, Marshall, Mich.

Roosevelt Field, Inc., Roosevelt Field, Mineola, L. I., N. Y.

Salzman Aircraft Service, Detroit City Airport, Detroit, Mich.

Seaboard Aircraft Sales, Roosevelt Field, Mineola, L. I., N. Y.

Shults Repair Depot, Phillips Airport, Bartlesville, Okla.

Sioux Skyways, Inc., P. O. Box 496, Sioux Falls, S. D.

Skyways, Inc., Cleveland Municipal Airport, Cleveland, Ohio

Snyder Aircraft Corp., 5036 W. 63rd St., Chicago, Ill.

Southern Air Service, Inc., Municipal Airport, Memphis, Tenn.

Southern Airways Sales Co., Inc., Municipal Airport, Birmingham, Ala.

Southwest Airmotive Co., Love Field, Dallas, Tex.

Southwest Aviation & Service Co., Municipal Airport, Oklahoma City, Okla.

Spartan School of Aeronautics, Municipal Airport, Tulsa, Okla.

Standard Aircraft Equipment Co., Hangar D, Roosevelt Field, Mineola, L. I., N. Y.

Standard Aircraft Instruments, Inc., Roosevelt Field, Mineola, L. I., N. Y.

Standard Aviation, Inc., Bendix Airport, Bendix, N. J.

Star Air Lines, Inc., Anchorage, Alaska

State Trade School, Connecticut State Bd. of Educ., 28 Providence St., Putnam, Conn.

Stearman Aircraft, Division of Boeing Airplane Co., R. F. D. 5, Wichita, Kan.

Stewart Technical School, The, 253-257 W. 64th St., New York, N. Y.

Story-Gawley Co., The, 6441 San Fernando Rd., Glendale, Calif.

Strachan Skyways, Inc., Municipal Airport, Savannah, Ga.

Tennessee Aero Corp., Municipal Airport, Nashville, Tenn.

Thompson Flying Service, Inc., Salt Lake Airport, Salt Lake City, Utah

Timm, Wally, Inc., 1020 Airway, Grand Central Air Terminal, Glendale, Calif.

Tipton, W. D., Lessee, Curtis-Wright Airport, Smith & Greenspring Aves., Baltimore, Md.

Transcontinental & Western Air, Inc., 10 Richards Rd., Kansas City, Mo.

Turner, Roscoe, Aeronautical Corp., Municipal Airport, Indianapolis, Ind.

United Air Lines Transport Corp., Municipal Airport, Cheyenne, Wyo.

U. S. Air Industries, 11409 Inglewood Ave., Inglewood, Calif.

Universal Aircraft Mfg. Corp., Sacramento Municipal Airport, Sacramento, Calif.

Valley Airways, Inc., Winchester Municipal Airport, Winchester, Va.

Vimalert Co., 813 Garfield Ave., Jersey City, N. J.

Virginia Airmotive, P .O. Box 2144, Roanoke, Va.

Waco Sales of New York, Inc., Roosevelt Field, Hangar 16, Mineola, L. I., N. Y.

Wallace Air Service, Felts Field, Parkwater, Wash.

The Walz Corp., Central Airport, Camden, N. J.

Western Flying Service, Inc., 2600 Oneida St., Denver, Colo.

Western Propeller Repair, 1138 Airway Drive, Glendale, Calif.

Western State Teachers College, Aviation Mechanics Dept., Kalamazoo, Mich.

Wichita Aviation Service, Hangar 3, Municipal Airport, Wichita, Kan.

Wiggins, E. W., Airways, Inc., Boston Municipal Airport, E. Boston, Mass.

Wiggins, E. W., Airways, Inc., Box 121, Norwood, Mass.

Wilmington-Catalina Airline, Ltd., Catalina Airport, Avalon, Calif.

Winks Field, Inc., Stanton Ave., & Narcissa Rd., Ambler, Pa.

Young's Aircraft Service, P. O. Box 102, Dover, N. J.

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(There are approximately 500 flying schools in the country. Lack of space prevents including them here. Nearly all of the distributors, who are listed beginning on page 171, give flight instruction. A free list of all flying schools may be secured from the Civil Aeronautics Administration, Commerce Bldg., Washington, D. C.)

Note: To conserve space, the various courses offered by the schools listed below have been keyed as follows:

A: Airline Operations
C: Correspondence
E: Engineering
F: Flight
I: Instruments
M: Short Mechanics Courses, such as welding, sheet metal, blueprint reading, etc.
MM: Master Mechanics Courses for A & E Licenses
R: Radio
Y: Other Miscellaneous Courses

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E, M, MM

Aeronautical Institute of Technology, 1121 W. Pico Blvd., Los Angeles, Calif.
Pres.—Leland T. Abbott
Registrar—C. F. Griswold
M

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Pres.—Lewis M. Churbuck
Registrar—George M. Gavin
A, E, F, M, MM

Aero Tech, 118 Sixth St., Pittsburgh, Pa.
V. Pres.—R. V. Trader
Registrar—R. Trader
E, M

Aero Technical Institute, 150 S. Washington, Wichita, Kans.
Pres.—E. S. Tasman
Registrar—W. O. Dixon
M

Aircraft Manufacturing School, 4377 Bronx Blvd., Bronx, New York, N. Y.
Pres.—Joseph N. Kearney
Registrar—Fred C. Thompson
M

American Aeronautical Institute, 2425 McGee St., Kansas City, Mo.
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M, MM

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Registrar—James J. Neely
C, I.

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Registrar—Henry E. Kriegel, V. P.
M.

Aviation Institute of America, Inc., Citizens Bank Bldg., Washington, D. C.
Owner & Registrar—Walter Hinton
C

Aviation Institute of Technology, 3601-35th Ave., Long Island City, N. Y.
Director—Frank J. Ambrose
Registrar—E. D. Whitman
E, M, MM, R

Aviation Preparatory School, 240 S. Market, Wichita, Kans.
Owners—P. J. Sharp, Cecil McCullough
Registrar—Kathryn Baker
M

Boeing School of Aeronautics, Oakland Airport, Oakland, Calif.
Director—T. Lee, Jr.
Registrar—D. L. McDaniel
A, E, F, M, MM

Brayton Flying Service, Inc., Lambert St. Louis Airport, Robertson, Mo.
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Registrar—L. A. Warner
F, M, MM

Buehler School of Aeronautics, 60-62 Mulberry St., Newark, N. J.
Pres.—Emil Buehler
Registrar—George Kupfer
M, MM, E

Cal-Aero Academy, Grand Central Air Terminal, Glendale, Los Angeles, Calif.
Pres.—Major C. C. Moseley
F

California Flyers, Inc., School of Aeronautics, Los Angeles Municipal Airport, Inglewood, Calif.
Pres.—Banks W. Smith
Registrar—Leroy S. Jarrett
E, F, I, M, MM

California Polytechnic School, San Luis Obispo, Calif.
Pres.—Juan A. McPhee
Registrar—Alice M. Daniel
E, MM

Cape Cod School of Aeronautics, Inc., Hyannis Airport, Cape Cod, Mass.
Pres. & Registrar—Alton B. Sherman
F, M

Casey Jones School of Aeronautics, Inc., 1100 Raymond Blvd., Newark, N. J.
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Registrar—Richard Whatham
E, MM

Chamberlin Aircraft Training Division, Inc., 163 Van Wagenen Ave., Jersey City, N. J.
185 Washington St., Newark, N. J.
Bendix, N. J.
Pres.—Clarence D. Chamberlin
Registrar—George C. Chamberlin
M

Chicago School of Aircraft Instruments, Division of Snyder Aircraft Corp., 5036 W. 63rd St., Municipal Airport, Chicago, Ill.
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Registrar—Dan S. Tilden
I, M

Clearfield Aviation Institute, P. O. Box 152, Clearfield, Pa.
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E, M, MM, Y

Cleveland Flying Service, Cleveland Municipal Airport, Cleveland, Ohio
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F, M

Curtiss-Wright Technical Institute of Aeronautics, Grand Central Air Terminal, Glendale, Calif.
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Registrar—O. D. McKenzie
E, M, MM

Dallas Aviation School and Air College, Love Field, Dallas, Texas
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F, I, M, MM, R

Dawson Institute of Technology, 989 McCarter Highway, Newark, N. J.
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Registrar—E. Carroll
A, E, F, M, MM

Detroit Institute of Technology, 2020 Witherell St., Detroit, Mich.
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Registrar—A. E. Johnson, Jr.
A, E, F, M

Embry-Riddle School of Aviation, 3240 N. W. 27th Ave., Miami, Fla.
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Registrar—Arthur E. Gibbons
F, M, MM

Engel Aircraft Metal School, Escondido, Calif.
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M

Faust Aircraft Sheetmetal Training School, P. O. Box 85, Jericho, L. I., N. Y.
M

Fletcher Aircraft Schools, 625 N. San Fernando Rd., Burbank, Calif.
Branches: Santa Monica, South Gate
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Registrar—Ralph A. Baker
E, M

Frye Aircraft Co., 416 Admiral Blvd., Kansas City, Mo.
Pres.—Donald Frye
Registrar—A. W. Villmoare
M

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Pres. & Registrar—J. W. Borton
MM

Irvin Aircraft School of San Diego, 1616 W. Lewis St., San Diego, Calif.
Pres.—George E. Irvin
Mgr.—B. H. de Selm
M

Lewis School of Aeronautics, Lockport, Ill.
Supt.—John H. Wilson
Registrar—Robert F. Blaine
E, F, MM

Lincoln Aeronautical Institute Inc., 2415 O St., Lincoln, Neb.
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Registrar—W. G. Frerichs
E, M, MM

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Director—Lewis H. Lawton, Jr.
M, MM

Mechanix Universal Aviation Service Co., Wayne County Airport, Detroit, Mich.
Pres.—Mr. Vaughn
C, E, F, MM

Missouri Aviation Institute, 334 Richards Rd., Municipal Airport, Kansas City, Mo.
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(Continued on page 234)

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Company names in Classified Directory Section arranged alphabetically

A

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V. Pres.—G. E. McArthur
Gen. Mgr.—W. S. Karr
Ch. Engr.—Bruce Buchanan
Prod. Mgr.—Alva Warren

Abrams Inst. Co., 606 Shirwasse St., Lansing, Mich.
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Gen. Mgr.—B. Van Kirk
Ch. Engr.—Milford B. Moore
Prod. Mgr.—Rudolph Royce

AC Spark Plug Co., General Motors Corp., 930 Harriet St., Flint, Mich.
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Ch. Engr.—C. W. McKinley
Sales Mgr.—W. S. Isherwood
Adv. Mgr.—Earl McGinnis
Pur. Agt.—Herbert Wells

Accurate Insulated Wire Co., 85 Willow St., New Haven, Conn.
Pres.—J. T. Whalen, Jr.

Ace Hardware Mfg. Co., 20198 Orleans St., Philadelphia, Pa.
Pres.—George Jones
Treas. & Gen. Mgr.—George M. Jones
Ch. Engr.—F. G. Schutz
Pur. Agt.—A. W. Engel

Acme Stamping & Mfg. Co., 201 Corliss St., Pittsburgh, Pa.
Pres.—Charles A. Kays
Pur. Agt.—H. J. Wilhelm

Acme White Lead & Color Works, 8250 St. Aubin Ave., Detroit, Mich.
V. Pres. & Gen. Mgr.—C. A. Campbell
Sales Mgr.—J. W. Strain
Adv. Mgr.—F. J. Schulte
Pur. Agt.—W. T. Glidden

Acorn Bearing Co., New Britain, Conn.
Pres.—Jacob Neubauer
V. Pres., Ch. Engr., Sales Mgr. & Pur. Agt.—Michael Neubauer

Acrotorque Co., 4815 Lexington Ave., Cleveland, Ohio
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V. Pres. & Ch. Engr.—Elias Orshansky, Jr.
V. Pres. & Gen. Mgr.—Edward D. Jackson
Pur. Agt.—Carl R. Carlson
Ch. Engr. Aeronautical Div.—E. W. Fuller

Adams & Westlake, Elkhart, Ind.

Adel Precision Products Corp., 10777 Van Owen St., Burbank, Calif.
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Asst. to Pres.—Harold E. Webb
Ch. Engr.—J. Lynn Reynolds
Sec.-Treas.—Wm. H. Lewis

Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago, Ill.
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V. Pres.—E. G. Grundstrom
Ch. Engr.—Harold Brand
Sales Mgr.—A. J. Peterson
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Ch. Engr.—C. C. Ross
Sales Mgr.—Roger Sears
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Auditor—E. E. Coleman

Advance Spring Corp., 1749 Carroll Ave., Chicago, Ill.
Pres.—F. C. Mueller
V. Pres. & Sales Mgr.—D. E. Mielke

Aerial Machine & Tool Corp., 260 West St., New York, N. Y.

Aero Instrument Co., 1003 Lorain Ave., Cleveland, Ohio

Aero Leather Clothing Co., 79 Ferry St., Beacon, N. Y
Pres.—Louis Bramer
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Aero Publishers, Inc., 120 N. Central Ave., Glendale, Calif.
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V. Pres. & Ch. Engr.—L. D. Bonham

Aero Research Wind Tunnel Co., 126 Williams St., Farmingdale, N. Y.
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Aero Service Corp., 1612 Chancellor St., Philadelphia, Pa.

Aero Spark Plug Co., 635 Greenwich St., New York, N. Y.
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Aero Tool Co., 231 Olive St., Burbank, Calif.
Pres.—Lester Deutsch
Sales Mgr.—Phillip Oldsman

Aero Trades Co., Roosevelt Field, Mineola, N. Y.
Partners—Ernst Scheifele & James G. McIntosh

Aeromarine Instrument Co., 385 Gerard Ave., New York, N. Y.
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Sales Mgr.—Fred Bohling

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Ch. Engr.—Bernard Knapp
Sales Mgr.—Chas. Fast

Aeroproducts Div., General Motors, 228 East First, Dayton, Ohio
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Ch. Engr.—C. S. MacNeil
Pur. Agt.—Herbert Layport
Factory Mgr.—Earl Stansel

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Gen. Mgr.—F. Peter Hirsch
Ch. Engr.—Marvin W. Brandau
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V. Pres. & Ch. Engr.—Warren Wiener
Prod. Engr.—Henry Janes

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Airadio Co., 2 Selleck St., Stamford, Conn.
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Ch. Engr. & Pur. Agt.—R. T. Bozak

Air Associates, Inc., Bendix, N. J.
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Adv. Mgr.—Robert E. Fowler
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Aircraft Products & Engineering Corp., West Chester, Pa.
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Adv. Mgr.—J. Tschoep
Ch. Engr. & Sales Mgr.—C. J. Lucas

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Sales Mgr.—Emerson V. Miller
Pur. Agt.—James H. Glassman

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Pur. Agt.—G. J. Wood
Res. Engr.—Soren K. Anderson

Airguide, Inc., Islip, N. Y.
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V. Pres. & Sales Mgr.—Harold Boyce
Ch. Engr.—W. Wiener

Air-Maze Corp., 5200 Harvard Ave., Cleveland, Ohio
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V. Pres.—O. H. Schaaf
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Ch. Engr.—P. C. Hungerford
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Gen. Mgr.—McMurdo Silver
Pur. Agt.—A. R. MacCalley

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Air-Safe Aircraft Instruments, 1030 N. Western Ave., Los Angeles, Calif.
Pres.—John Felix Carssow
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Pres., Ch. Engr., Adv. Mgr. & Pur. Agt.—Alexander A. Pedu
Sales Mgr.—W. Goetz

Air-Ways Equipment Corp., Milwaukee, Wis.

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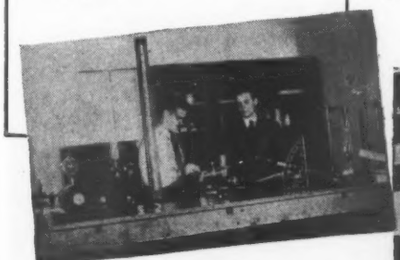

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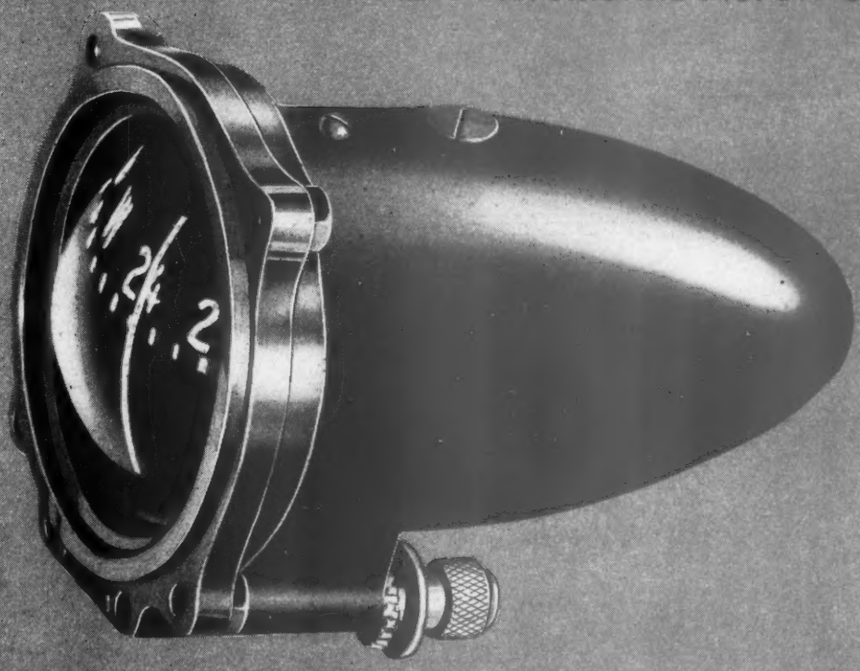

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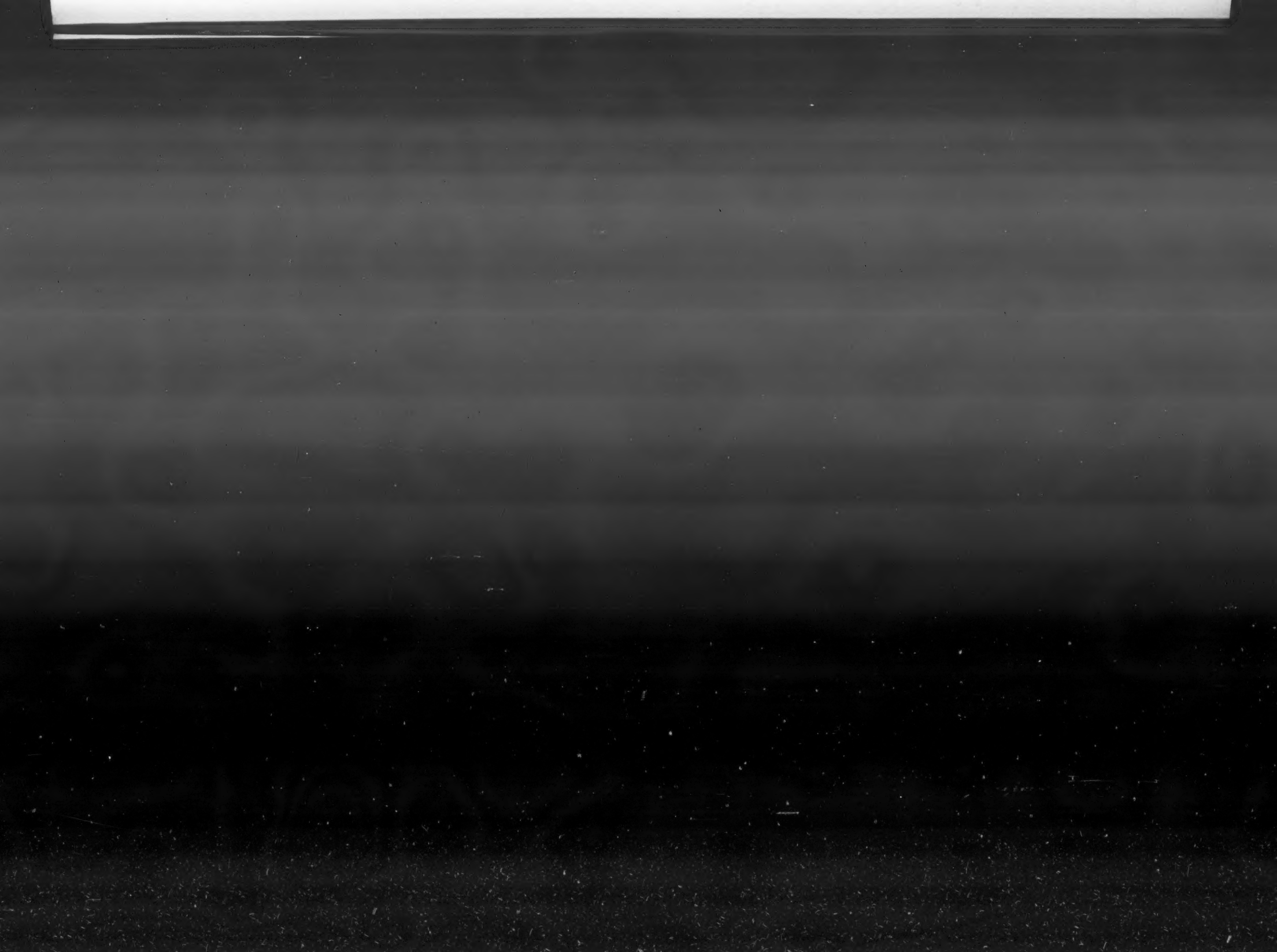

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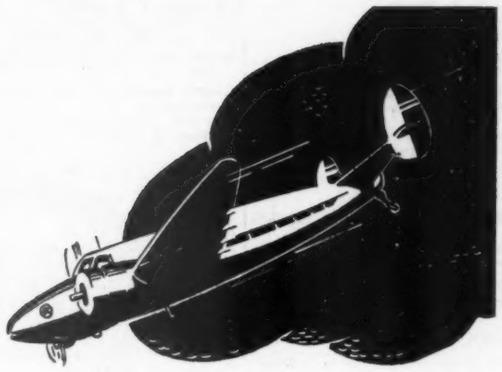

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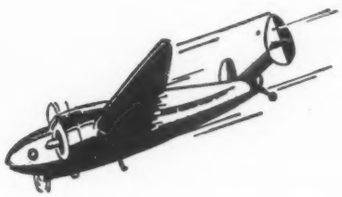

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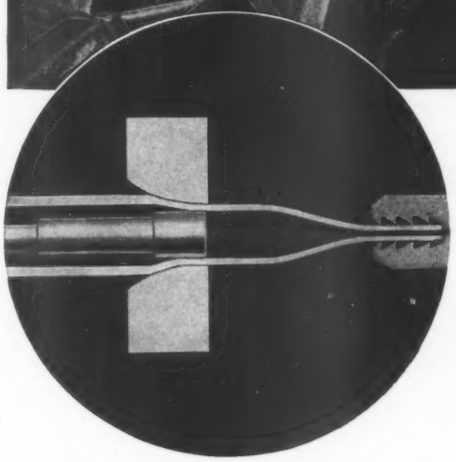

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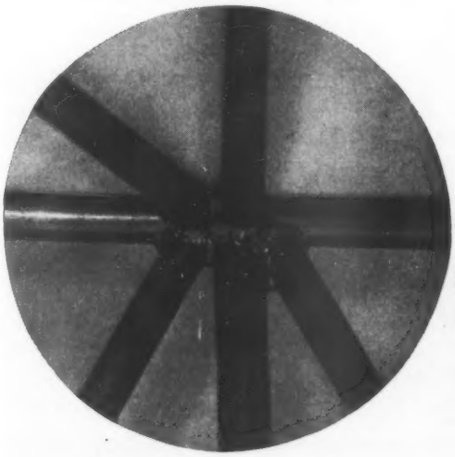

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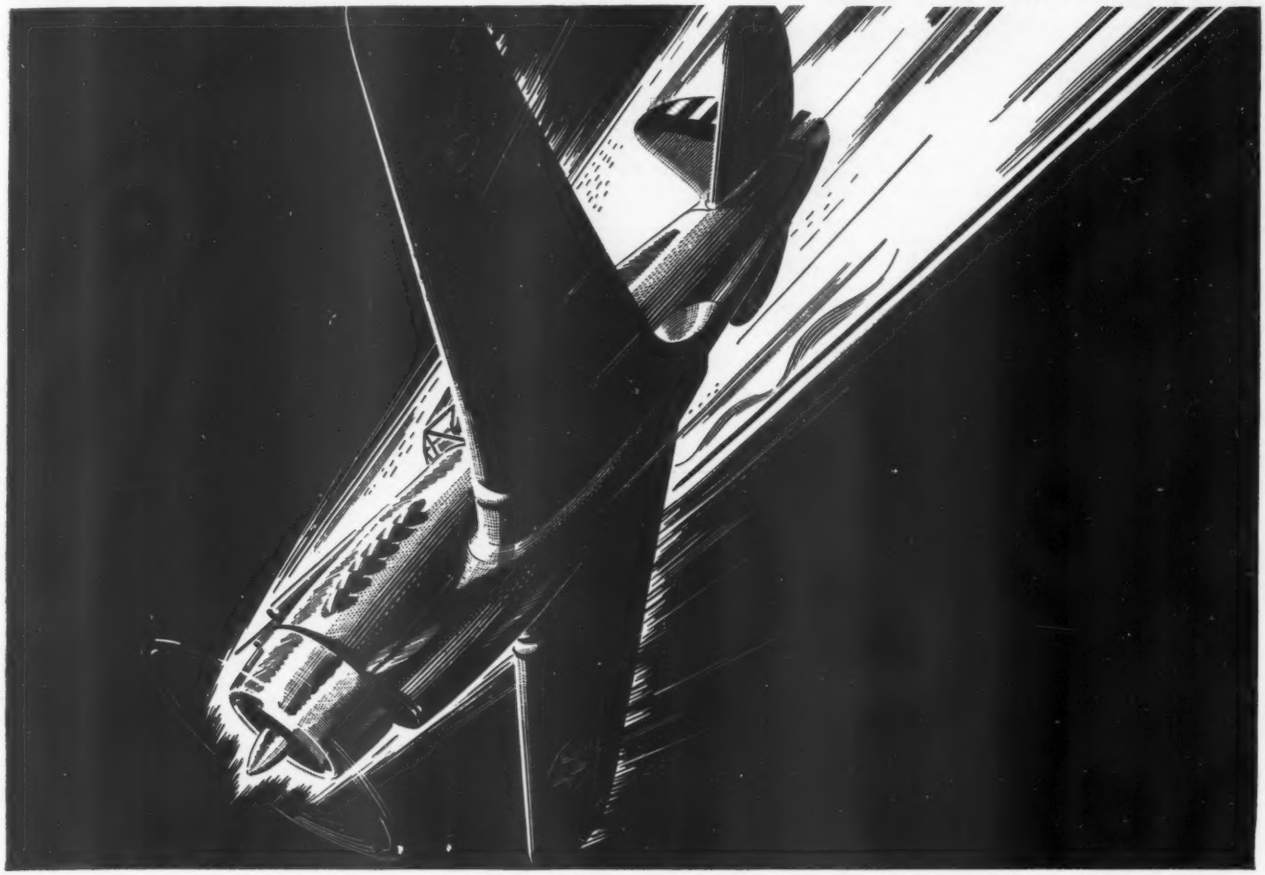

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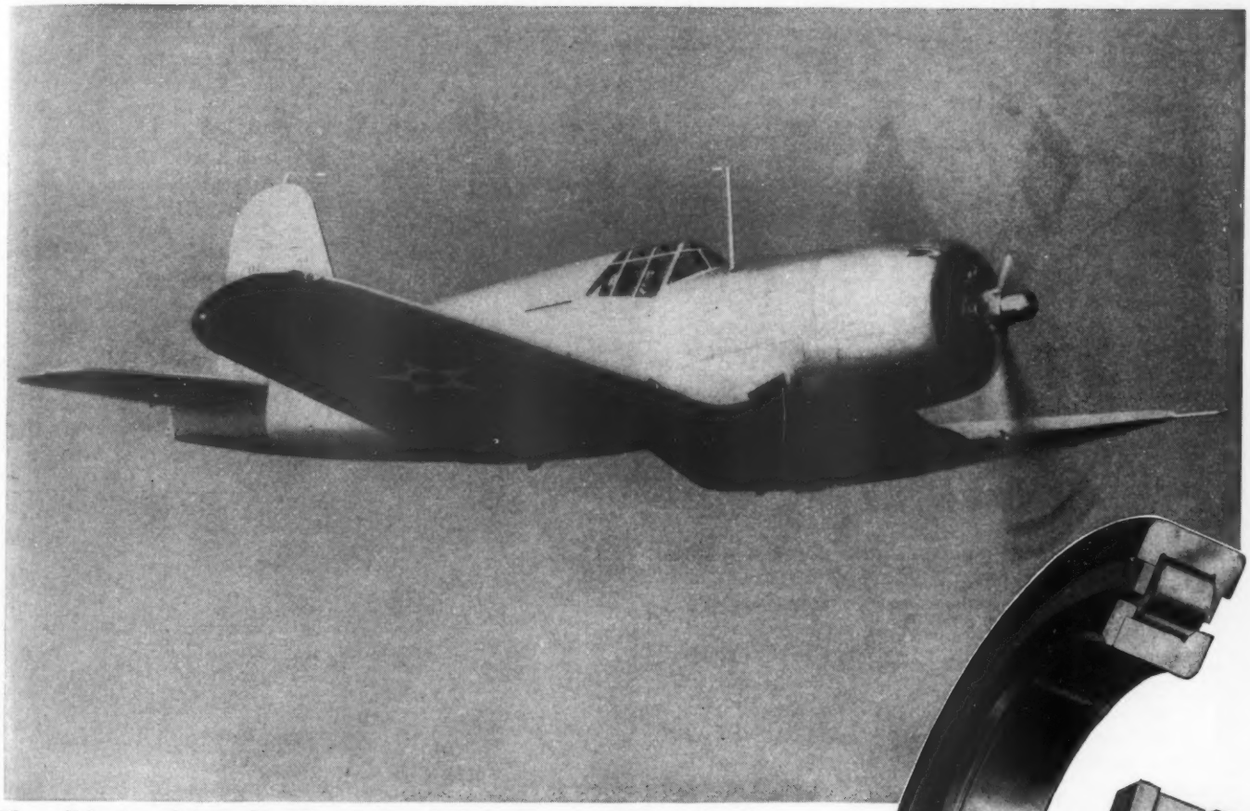

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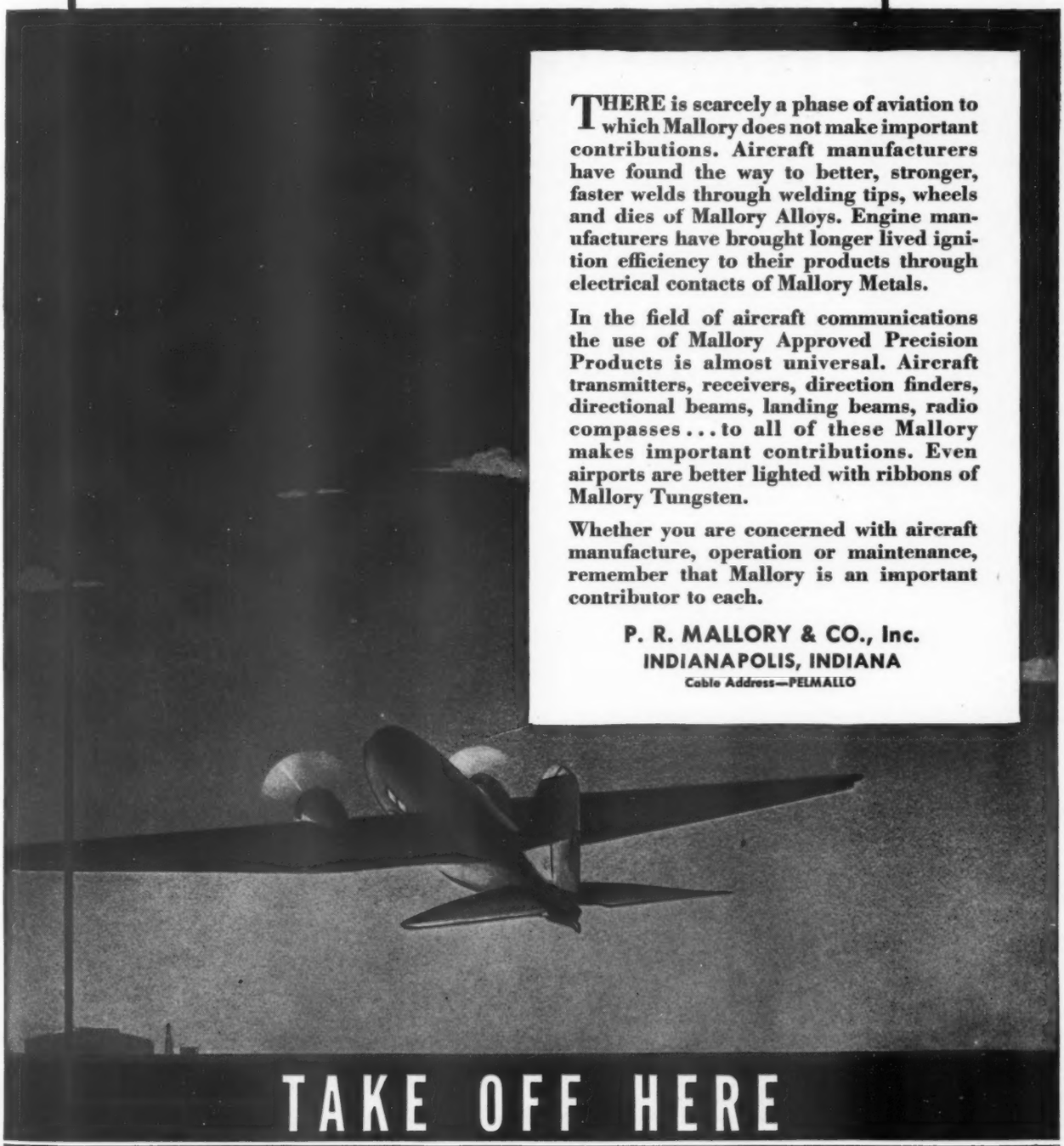

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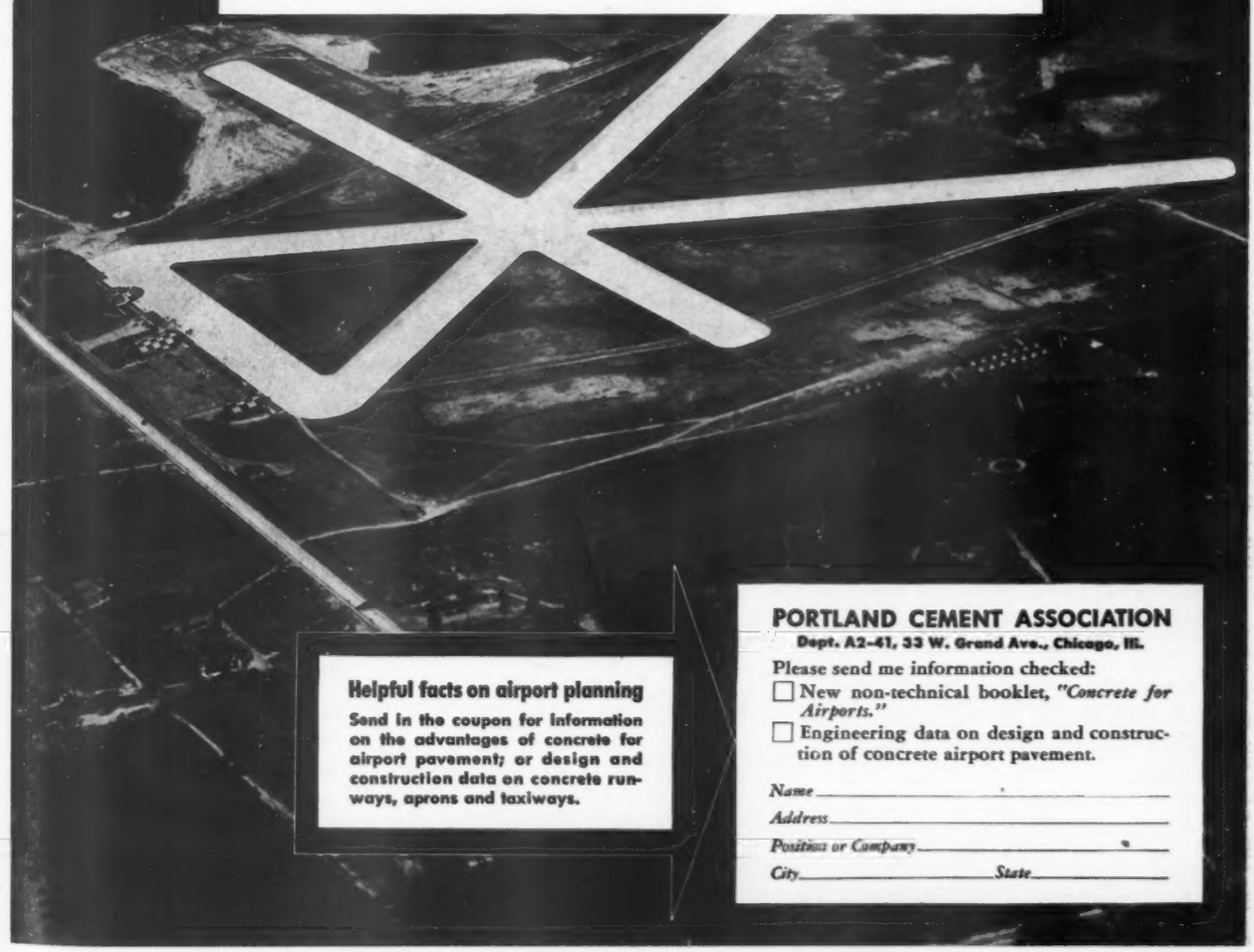

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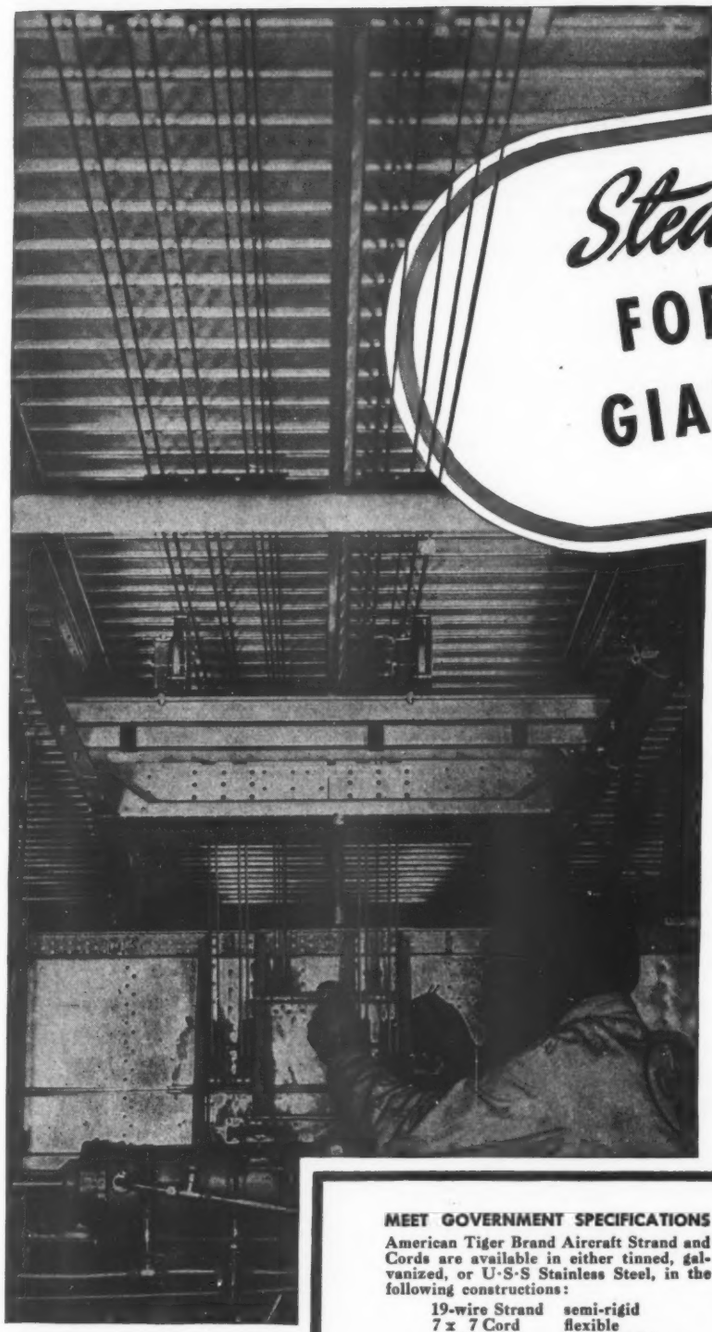

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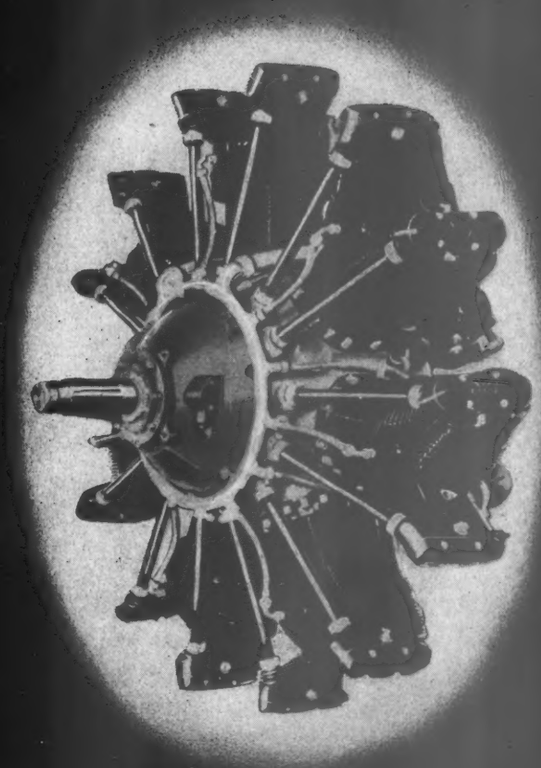

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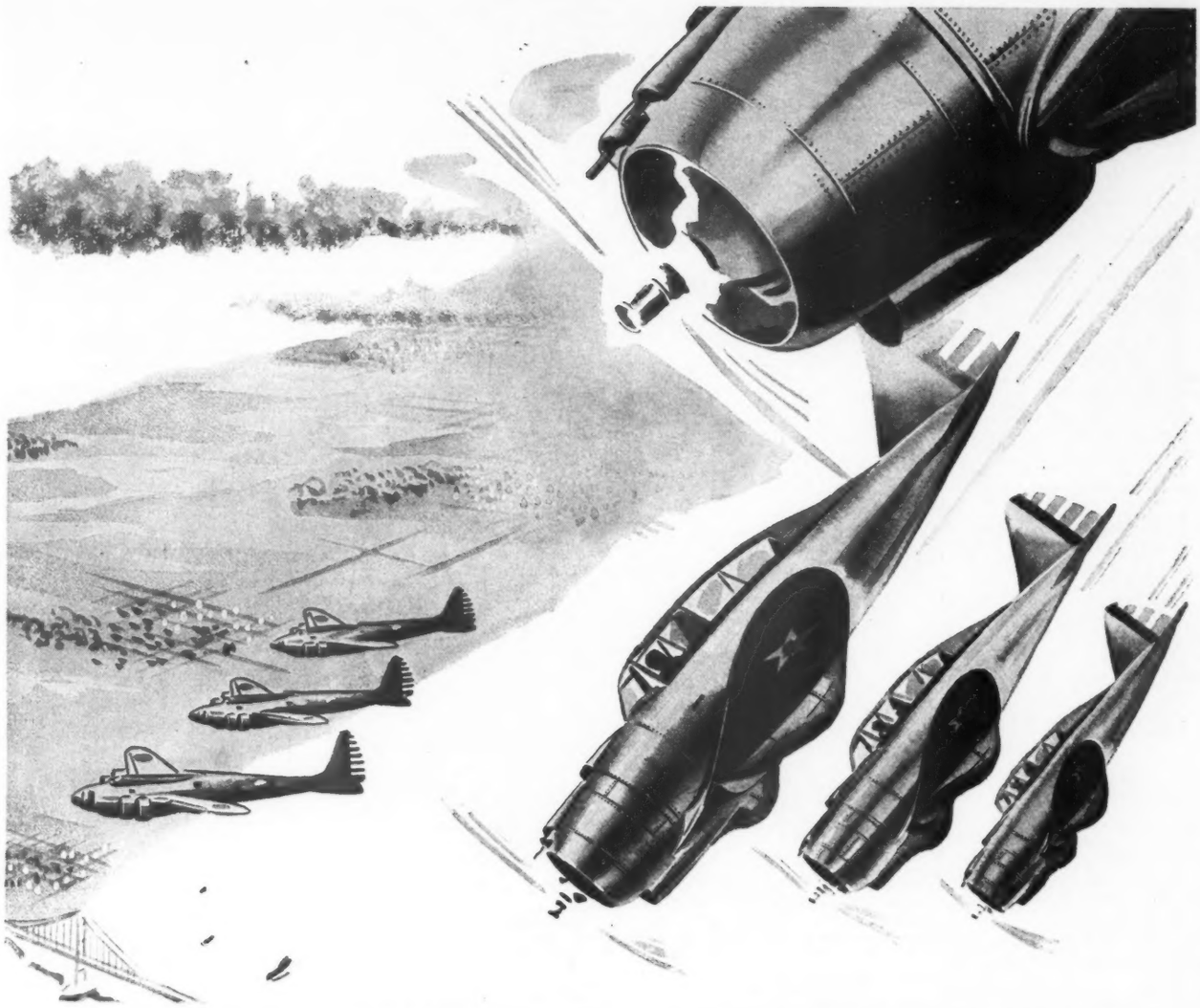

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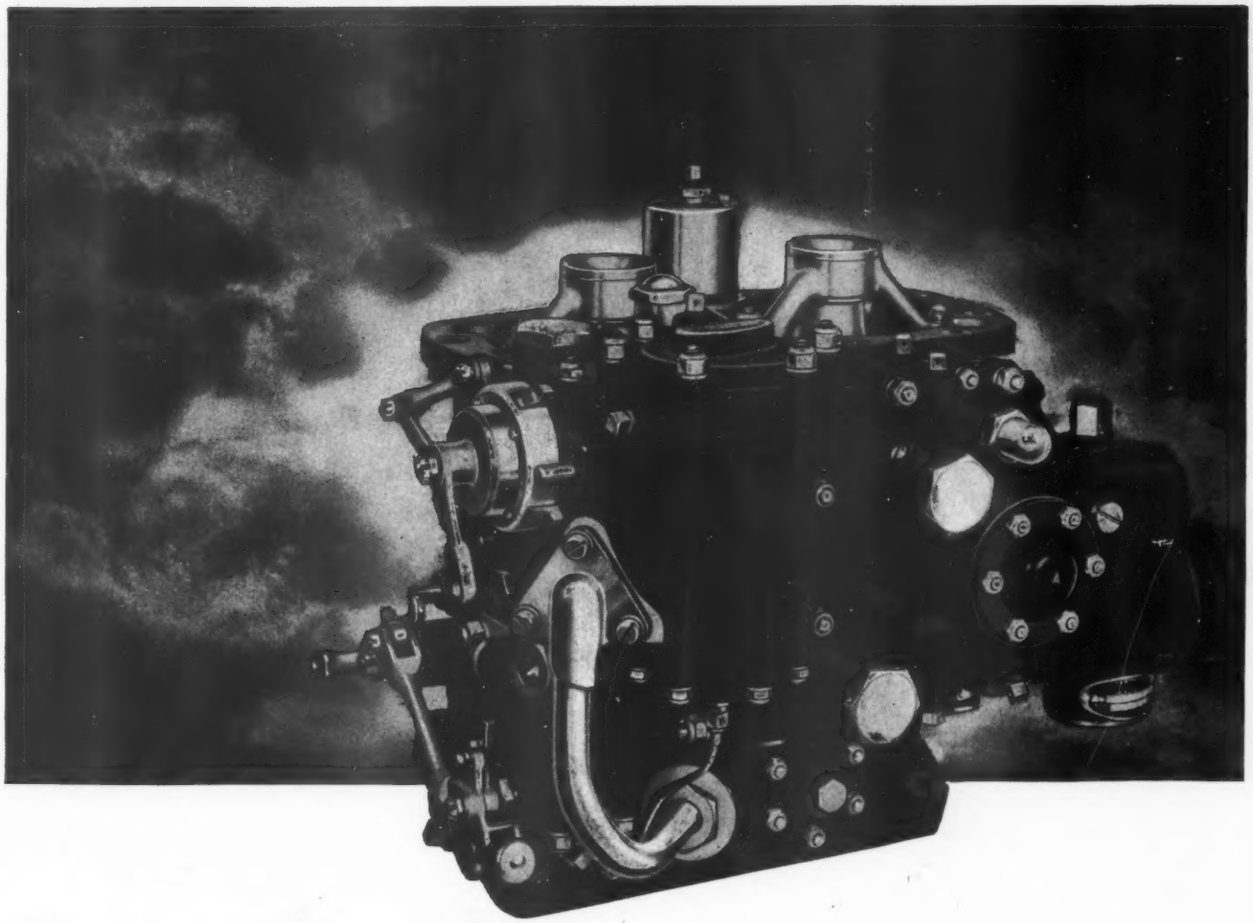

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Works Mgr.—R. W. Stoddard
Pur. Agt.—A. M. Hansen

Y

Yale & Towne Mfg. Co., 548 Pacific St., Stamford, Conn.

Yoho & Hooker Lumber Co., Youngstown, Ohio
Pres.—Jud Yoho
V. Pres.—D. E. Hooker
Ch. Engr.—James Walters

York Heating & Ventilating Corp., Philadelphia, Pa.

Young Radiator Co., 709 Marquette St., Racine, Wis.
Pres.—F. M. Young
V. Pres. & Sales Mgr.—J. J. Hilt
V. Pres.—M. F. May
Ch. Engr.—W. V. Astrup
Adv. Mgr.—C. E. Pugh
Pur. Agt.—R. W. Baggott

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Pres.—L. A. Young
V. Pres.—C. M. Young
Ch. Engr.—George Nelson
Sales Mgr.—T. D. Stewart
Gen. Mfg. Mgr.—N. Maskill
Pur. Agt.—T. Couper

Z

Zapon Co., 60 E. 42d St., New York, N. Y.

Zeiss, Inc., Carl, 485 Fifth Ave., New York, N. Y.

Zenith Radio Corp., 6011 Dickens Ave., Chicago, Ill.

Zielinski Co., Michael A., 694 So. Broad St., Trenton, N. J.
Pres.—M. A. Zielinski

ACCESSORY DIRECTORY

Featuring aircraft and engine accessories, materials and parts, airport and shop equipment, and jobbers

Addresses of these firms are listed alphabetically beginning on page 185.

Adhesives—see **Glues**

Altimeters—see **Instruments**

Armament and Equipment

Aircraft Engineering Products, Inc.
American Armament Corp.
Barnard Aviation Equipment Co.
Breeze Corporations
Colonial Alloys Co.
Colt's Patent Fire Arms Mfg. Co.
Columbia Steel Co.
Fleetwings, Inc.
Interstate Aircraft & Engrg. Corp.
Jessop Steel Co.
Kenyon Instrument Co.
Mallory & Co., P. R.
McDonnell Aircraft Corp.
Moore-Eastwood & Co.
Pollak Mfg. Co.
Quality Electric Co.
Republic Aviation Corp.
Standard Aircraft Products
Tietzmann Engrg. Co., Inc.
Triumph Explosives, Inc.
Twin City Tool Co.
United Aircraft Products, Inc.
Vega Airplane Co.
Voges Mfg. Co.
Wagner Co., Paul G.
Whiting Corp.
Worcester Pressed Steel Co.

Batteries

Air Radio & Instrument Co.
American Hard Rubber Co.
Burgess Battery Co.
Electric Auto-Lite Co.
Electric Storage Battery Co.
General Lead Batteries Co.
Goodrich Co., B. F.
Gould Storage Battery Corp.
Lear Avia, Inc.
National Battery Co.
Prest-O-Lite Battery Co.
Reading Batteries, Inc.
Taylor Airphone Products, Inc.
Triumph Explosives, Inc.
Willard Storage Battery Co.

Beacons—see **Lights and Accessories, Airport**

Bearings

AC Spark Plug Div. General Motors Corp.
Acorn Bearing Co.
Ahlberg Bearing Co.
Allison Engineering Co., Div. General Motors Corp.
American Non-Gran Bronze Corp.
Atlas Brass Foundry
Bantam Bearings Corp.
Bearium Metals Corp.
Bound Brook Oil-less Bearing Co.
Bunting Brass & Bronze Co.
Chrysler Corp., Amplex Div.
Cleveland Graphite Bronze Co.
Cosco Mfg. Co.
Ertel Machine Co.
Fafnir Bearing Co.
Federal Bearings Co.
Geneva Metal Wheel Co.
Gwilliam Co.
Heim Co.
Hoof Products Co.
Johnson Bronze Co.
Mallory & Co., P. R.
Marlin-Rockwell Corp.
McQuay-Norris Mfg. Co.
New Departure Div. General Motors Corp.
Norma-Hoffman Bearings Corp.
Orange Roller Bearing Co.
Pacific Bearings Co.
Phillips Bronze Bushing Works
Phosphor Bronze Smelting Co.
Precision Bearings, Inc.
Progressive Brass Mfg. Co.
Randall Graphite Products Corp.
S K F Industries, Inc.
Springfield Brass Co.
Timken Roller Bearing Co.
Torrington Co.

Bearings Metal—see **Metals, Bearing**

Belts, Safety

Air Transport Equipment, Inc.
Comstock & Co.
Johnny's Parachute & Equipment Co.
Mellus Bros. & Co.
Parachute Corp. of America
Russell Mfg. Co.
Switlik Parachute & Equipment Co.

Bolts—see **Screws, Nuts and Bolts, Brakes** see also **Wheels and Brakes**

General Tire & Rubber Co.
Goodrich Co., B. F.
Goodyear Tire & Rubber Co.
Johns-Manville
National Acme Co.
Shuler Axle Co.

Buildings

Allith-Prouty, Inc.
American Roof Truss Co.
Austin Co.
Barrett Co.
Bethlehem Steel Co.
Blaw-Knox Co.
Butler Mfg. Co.
Byrne Doors, Inc.
Carrl Son's, C. W.
Columbian Steel Tank Co.
Cornell Rolling Door Works
Edwards Mfg. Co.
Herrick Iron Works
Independent Iron Works
Ingalls Iron Works Co.
International Derrick & Equipment Div. International-Stacey Corp.
International Steel Co.
Kinnear Co.
Maryland Metal Building Co.
Robertson Co., H. H.
Roof Structures, Inc.
Timber Engineering Co.
Trachte Bros. Co.
Truscon Steel Co.

Bushings, Bronze—see **Bearings**

Cable, Control—see **Wire and Cable, Structural**

Cable, Electrical—see **Wire and Cable, Electrical**

Cables, Strctural—see **Wire and Cable, Structural**

Cameras and Supplies

Adel Precision Products Corp.
Cunningham-Hall Aircraft Corp.
Eastman Kodak Co.
Fairchild Aviation Corp.
Folmer Graflex Corp.
Highbridge-International Co.
Hurd Mfg. Corp., Mark
Kenyon Instrument Co.
Photo Record Equipment Co.
Rogers Mfg. Co., Dayton
Shakespeare Products Co.
Skyview Camera Co.
Technical Products Co.
Twin City Tool Co.
Zeiss, Inc., Carl

Carburetors

Bendix Products Div. Bendix Aviation Corp.
Chandler-Evans Corp.
Holley Carburetor Co.
Marvel-Schebler Carburetor Div. Borg Warner Corp.
Siebenthaler Div., Aircraft Accessories Corp.
Standard Aircraft Equipment Co.
Zenith Radio Corp.

Castings, Die

Corbin Screw Corp.
Doehler Die Casting Co.
Dollin Corp.
Dow Chemical Co.
Electric Auto-Lite Co.
Harvill Aircraft Die Casting Corp.
Lobdell-Emery Mfg. Co.
Newton New Haven Co.
Ohlsson & Rice Mfg. Co.
Southern California Plating Co.
Tietzmann Engineering Co.
Toman & Co., E.

Castings, Sand

Advance Aluminum Castings Corp.
Aluminum Industries, Inc.
Ampco Metal, Inc.
Arrow Brass Foundry
Atlas Brass Foundry
Bacon Vulcanizer Mfg. Co.
Bearium Metals Corp.
Burd Piston Ring Co.
Catskill Metal Works, Inc.
Challenge Machine Co.
Chase Brass & Copper Co.
Cooper Alloy Foundry Co.
Corbin Screw Corp.
Dow Chemical Co.
Electric Auto-Lite Co.
Flynn & Emrich Co.
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Heath Co.
Hills-McCanna Co.
Johnson Bronze Co.
Kay-Brunner Steel Products, Inc.
Key Co.
Lobdell-Emery Mfg. Co.
Magnesium Products, Inc.
Manufacturers' Iron Foundry
Meehanite Metal Corp.
Milwaukee Valve Co.
National Aircraft Equipment Co.
North Wales Machine Co.
Oberdorfer Brass Co., M. L.
Paulson & Son, Inc., Thomas
Phillips Bronze Bushing Works
Phosphor Bronze Smelting Co.
Progressive Brass Mfg. Co.
Prosser & Son, Thomas
Rogers Pattern & Foundry Co.
Ross-Meehan Foundries
Siebenthaler Div., Aircraft Accessories Corp.
Springfield Brass Co.
Star Marine Engine Works
Stricker-Brunhuber Corp.
Uniloy Accessories Corp.
Warman Steel Casting Co.

Charts and Handbooks

Aero Publishers, Inc.
La Rue Printing Co.
McGraw-Hill Book Co.
Pitman Publishing Co.
Range Data, Inc.
Weems System of Air Navigation

Clothing and Uniforms

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Air Transport Equipment, Inc.
Anderson Flax Fiber Co.
Chicago Uniform & Cap Co.
Craddock Uniforms
Johns-Manville
Multifold Manufacturing Co.
Perry Sportswear, Inc.
Russell Uniform Co.

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MOTORIZED FURNACES

for melting

BRASS—BRONZE—ALUMINUM—MAGNESIUM and other NON-FERROUS ALLOYS

The Fisher Motorized Nose Pouring Melting furnace is the most recent addition to the complete line of Fisher Furnaces. It can be supplied for any crucible size available and for iron or steel pots. Largest capacity made to date—2000 lbs. of magnesium metal.

The Fisher Nose Pouring Furnace features a constant pouring arc; a positive and instantly controlled pouring rate; reduced overall furnace height; elimination of arduous labor during pouring operation.

The complete Fisher line includes all standard designs of both stationary and tilting furnaces. The Fisher M. N. P. furnace is fully described in Bulletin No. 57. Write for your copy.

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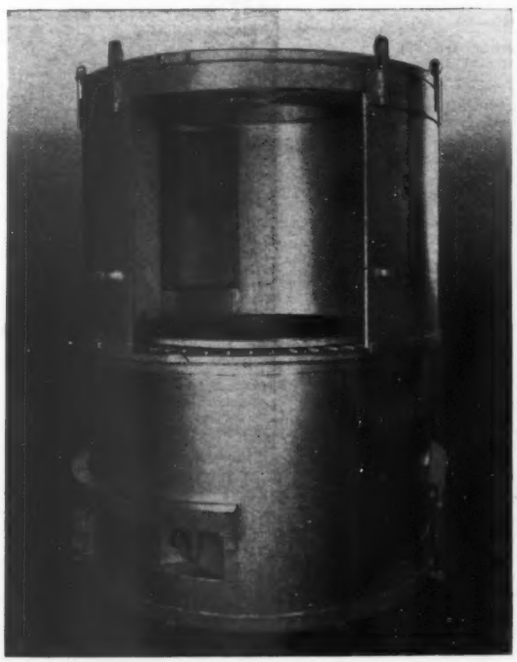
FOR MELTING—ALLOYING—HOLDING DIE CASTING METAL

Melting costs as low as 11¢ per ton are accredited the Fisher Iron Pot Melting Furnaces. A few of the design features making this low cost possible, are: proper combustion of gases before leaving combustion chamber; correctly proportioned flue area to size of furnace; elimination of dead pockets of inert gases granting freedom of circulation and uniform distribution of hot gases to entire pot surface; tangential firing burners; high grade insulated refractory lining and rugged construction. Available in gas or oil fired units with capacities from 100 to 10,000 pounds in zinc. Write for Bulletin No. 101.



Melting time is reduced and new standards of uniformity are established, with a material saving in melting costs, by the individuality of furnace design and construction resulting from Fisher's thirty-five years of experience in foundry equipment manufacture. Fisher engineers will counsel to co-ordinate equipment to plant conditions for maximum efficiency. Consult Fisher engineers on your melting problems.

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Airplane & Marine Direction Finder Corp.
American Aircraft Radio, Div. of Searle Aero Industries, Inc.
Bendix Aviation, Ltd.
Doolittle Radio, Inc.
Fairchild Aviation Corp.
Fisher Research Laboratory
Frazar & Co.
Gray Radio Co.
Harvey Radio Laboratories, Inc.
Lear Avia, Inc.
Mallory & Co., P. R.
Micamold Radio Corp.
Panoramic Radio Corp.
RCA Mfg. Co.
Radio Navigational Instrument Corp.
Siebenthaler Div., Aircraft Accessories Corp.
Stratosearch, Inc.
Washington Institute of Technology, Inc.
Westinghouse Electric & Mfg. Co.

Compounds, Cleaning

American Chemical Paint Co.
Baltimore Paint & Color Works, Inc.
Bendix Products Div. Bendix Aviation Corp.
Cee Bee Chemical Co.
Chicago Thrift Co.
Circo Products Co.
Detroit Rex Products Co
du Pont de Nemours & Co., E. I.
Fink-Dumont-White, Inc.
Fischer's Surfa-Saver, Inc.
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Houghton & Co., E. F.
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Miller Mfg. Co.
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Sugar Beet Products
Turco Products, Inc.

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Sullivan Machinery Co.
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Controls

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Tietzmann Engineering Co.
Voges Mfg. Co.
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Bakewell Mfg. Co.
Bendix Aviation, Ltd.
Dowty Equipment Corp.
Fleetwings, Inc.
Harlow Aircraft Co.
Houde Engineering Corp.
Interstate Aircraft & Engrg. Corp.
Logansport Machine, Inc.
Marquette Metal Products Co.
Pacific Aviation, Inc.
Pump. Engrg. Service Corp.
Republic Aircraft Products, Div. of Aviation Corp.
Romec Pump Co.
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Smith Henry Corp.
Sperry Products, Inc.
Technical Products Co.
Uebelhoer Brothers, Inc.
United Aircraft Products, Inc.
Vard Mechanical Laboratory
Vickers, Inc.
Wagner Co., Paul G.
Warner Aircraft Corp.

Coolers, Oil—see Radiators

Cord, Shock—see Struts and Cord, Shock

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Harlow Aircraft Co.
Heath Co.
Johnny's Parachute & Equipment Co.
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Monsanto Chemical Co., Merrimac Div.
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Ryan Aeronautical Co.
Swedlow Aeroplastics Corp.
Switlik Parachute & Equipment Co.
Wilber & Son

Cowls

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Aircraft Development Co.
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Buhl Stamping Co.
Carli Son's, C. W.
Engel Aircraft Specialties
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Harlow Aircraft Co.
Hill Aircraft Streamliners Co.
Mc Donnell Aircraft Corp.
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Pollak Mfg. Co.
Robertson Aircraft Corp.
Ryan Aeronautical Co.
St. Louis Aircraft Corp.
Skylark Aircraft Corp.
Teicher Mfg. Corp.
Tennessee Aircraft Institute, Inc.
Timm Aircraft Corp.
Vega Airplane Co.

Cushions, Seat—see Seats

Dampers, Vibration

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Aircraft Engineering Products, Inc.
Aro Equipment Co.
Benson Mfg. Co.
Chicago Thrift Co.
Eclipse Aviation Div. Bendix Aviation Corp.
Fuel Development Corp.
Goodrich Co., B. F.
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Pump Engrg. Service Co.
Quality Electric Co.
Siebenthaler Div., Aircraft Accessories Corp.
Standard Aircraft Equipment Co.

Dynamotors

Air Radio & Instrument Co.
Bogue Electric Co.
Carter Motor Co.
Continental Electric Co.
Eicor, Inc.
Electric Specialty Co.
Jack & Heintz, Inc.
Lear Avia, Inc.
Pioneer Gen-E-Motor Corp.
Quality Electric Co.
Standard Aircraft Equipment Co.

Equipment, Aircraft Lighting—see also Plugs, Electrical Connecting—also Switches

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American Phenolic Corp.
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Boston Insulated Wire & Cable Co.
Cannon Electric Development Co.
Connecticut Telephone & Electric Corp.
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Drake Manufacturing Co.
Grimes Mfg. Co.
Harlow Aircraft Co.
Jones, Howard B.
Kenyon Instrument Co.
Kenyon Transformer Co.
Kollsman Instrument Div., Square D Co.
Lear Avia, Inc.
Lights, Inc.
Littlefuse, Inc.
Mallory & Co., P. R.
Photo Record Equipment Co.
Pyle-National Co.
Roebling's Sons Co., John A.
S & M Lamp Co.
Scintilla Magneto Div., Bendix Aviation Corp.
Simplex Wire & Cable Co.
Sparks-Withington Co.
Standard Aircraft Equipment Co.
Standard Aircraft Products, Inc.
Westinghouse Electric & Mfg. Co.
United States Radium Corp.

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Bryant Heater Co.
Butler Mfg. Co.
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Couch Co., S. H.
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Guth Co., Edwin F.
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Independent Iron Works
La Mar Indicating Fuse Corp.
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Simmonds Aerocessories, Inc.
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Sparks-Withington Co.
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Stewart, M. C.
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Twin City Tool Co.
White Co., David
Whiting Corp.

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Automatic Electric Co.
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Bogue Electric Co.
Boston Insulated Wire & Cable Co.
Bryant Electric Co.
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Dunn, Inc., Struthers
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Electric Service Supplies Co.
Electric Specialty Co.
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Guardian Electric Mfg. Co.
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Hart Mfg. Co.
Holophane Co.
Jones, Howard B.
Kenyon Transformer Co.
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Lights, Inc.
Mallory & Co., P. R.
North American Electric Lamp Co.
States Co.
Thomas & Betts Co.
Tietzmann Engrg. Co.
Triumph Explosives, Inc.
United Transformer Corp.
Ward Leonard Electric Co.
Westinghouse Electric & Mfg. Co.
Wheeler Reflector Co.

Equipment, First Aid—see First-Aid, Kits and Supplies

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Dietzen Co., Eugene
Eagle Pencil Co.
General Aircraft Supply Corp.
Keuffel & Esser Co.
Kohinoor Pencil Co.
Ozalid Products Div., General Aniline & Film Corp.
Pease Co., C. F.
Post Co., Frederick

Equipment, Shop

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Air Reduction Sales Co.
Air Transport Equipment, Inc.
Aircraft Accessories Corp.
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Allen Electric & Equipment Co.
Aluminum Ladder Co.
American Chain & Cable Co.
American Instrument Co.
Atlas Press Co.
Baird Machine Co.
Baker Industrial Truck Div. of Baker-Raulang Co.
Baldor Electric Co.
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Biddle Co., James G.
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Blackhawk Mfg. Co.
Brown Instrument Co.
Brunner Mfg. Co.
Buckeye Portable Tool Co.
Buffalo Forge Co.
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Cincinnati Milling Machine & Cincinnati Grinders, Inc.
Continental Machines, Inc.
Couse Laboratories, Inc.
Cullman Wheel Co.
Curtis Pneumatic Machinery Co.
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Detroit Surfacing Machine Co.
DeVilbiss Co.
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Ex-Cell-O Corp.
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Fairbanks, Morse & Co.
Fansteel Metallurgical Corp.
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Harris Calorific Co.
Hartford Special Machinery Co.
Haskins Co., R. G.
Heald Machine Co.
Heinemann Circuit Breaker Co.
Hendey Machine Co.
Hensle Machine & Tool Works, Emil
Herbrand Corp.
Hobart Bros. Co.
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Hydraulic Press Manufacturing Co.
Ideal Electric & Mfg. Co.
Illinois Testing Laboratories, Inc.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
International Engrg. Works, Inc.
Jacobs Mfg. Co.
Johnson Co., Lloyd S.
Johnson Machine Co., Carlyle
Kester Solder Co.
Kirk & Blum Mfg. Co.
Knu-Vise, Inc.
Koch Sons, Inc., George
Landis Tool Co.
Le Blond Machine Tool Co., R. K.
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Linde Air Products Co.
Lisle Corp.
Lodge & Shipley Machine Tool Co.
Lovejoy Tool Co.
Lufkin Rule Co.
Lyon Metal Products, Inc.
Magnaflux Corp.
Manley Mfg. Div., American Chain & Cable Co.
Martin-Decker Corp.
Metal & Thermit Corp.
Micromatic Hone Corp.
Milburn Co., Alexander
Millers Falls Co.
Misener Mfg. Co.
Morris Engineering Co.
National Aircraft Equipment Co.
National Automatic Tool Co.
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National Machinery Co.
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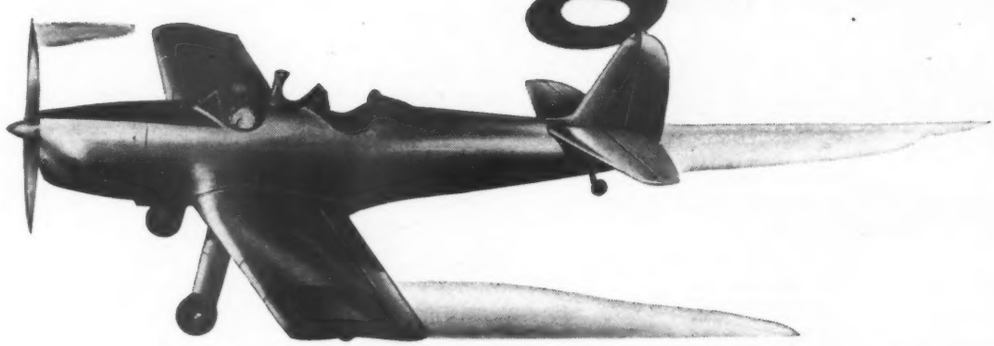
Vega Announces

AN ALL-METAL PRIMARY-SECONDARY TRAINER

the Vega 35



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The Vega 35 offers training schools excellent serviceability and features never before found in *one* airplane. Students learn the *right* form... right from the start of their training. Excellent visibility with in-line engines... perfected stall control characteristics... wide tread landing gear with individually controlled brakes... and wing flaps for low landing speed. Such features simplify the job of the instructor and inspire confidence in the student.

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Simonds Saw & Steel Co.
Skilsaw, Inc.
Smith Welding Equipment Corp.
Snap-On Tools Corp.
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Sunnen Products Co.
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Tannewicz Works
Televiso Products, Inc.
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Tietzmann Engineering Co.
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Tolhurst Centrifugal Div., American Machine & Metals, Inc.
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Union Special Machine Co.
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Van Norman Machine Tool Co.
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Vinco Corp.
Vlchek Tool Co.
Walker Mfg. Co.
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White Dental Mfg. Co., S. S.
Whiting Corp.
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Wilkening Mfg. Co.
Williams & Co., J. H.
Wilson Co., H. A.
Yale & Towne Mfg. Co.
Zeiss, Inc., Carl

Extinguishers, Fire

American-LaFrance-Foamite Corp.
Badger Fire Extinguisher Co.
Cardox Corp.
C-O-Two Fire Equipment Co.
Dugas Engineering Corp.
Fog Nozzle Co.
Fyr-Fyter Co.
General Fire Truck Corp.
Kidde & Co., Walter
Peiger, McCaw & Co.
Phister Mfg. Co.
Pyrene Mfg. Co.
Rockwood Sprinkler Co.
Snyder & Son, M. L.
Stempel Fire Extinguisher Mfg. Co.
Wil-X-Mfg. Corp.

Extrusions, Metal

Ampco Metal, Inc.
Baltic Metal Products Co.
Carpenter Mfg. Co., E. W.
Chase Brass & Copper Co.
Chicago Thrift Co.
Cosco Mfg. Co.
Dow Chemical Co.
Magnesium Products, Inc.
Nicralumin Co.
Reynolds Metals Co.
Steel Forming Corp.

Fabrics, Aircraft

Air Associates, Inc.
Aircraft Steel & Supply Co.
Anderson Flax Fiber Co.
Blanchard Bro. & Lane
Landers Corp.
Mellus Bros. & Co.
Pantasote Co.
Peiger, McCaw & Co.
Schwarzenbach Huber Co.
Seaman Paper Co.
Suncook Mills
Thorp & Co., J. H.
Uniform Hood Lace Co.
Wauregan-Quinebaug Mills, Inc.
Wellington Sears Co.

Fabrics, Upholstery

Anderson Flax Fiber Co.
Backstay Welt Co.
Ribb Mfg. Co.
Blanchard Bro. & Lane
Blumenthal & Co., Sidney
Bridgeport Fabrics, Inc.
Broad Brook Co.
Chase & Co., L. C.
Cluff Fabric Products, Inc.
Collins & Aikman Corp.
Comstock & Co.
Conneaut Leather Co.
du Pont de Nemours & Co., E. I. (Fabrikoid Div.)
Eagle-Ottawa Leather Co.
Gillette & Co., John W.
Goodrich Co., B. F.
Johnson & Faulkner, Inc.
Kenwood Mills
Lackawanna Leather Co.
Laidlaw Co.
Landers Corp.
Massachusetts Mohair Plush Co.
Mellus Bros. & Co.
Pantasote Co.
Payne & Co.
Peiger, McCaw & Co.
Radel Leather Mfg. Co.
Schlegel Mfg. Co.
Schumacher & Co., F.
Schwarzenbach Huber Co.
Shelton Looms
Tallmadge Co.
Thorp & Co., J. H.
United States Rubber Co.

Fasteners
see also **Screws, Nuts and Bolts**

American Screw Co.
Anderson Flax Fiber Co.
Anti-Corrosive Metal Products Co.
Camloc Fastener Co.
Cinch Mfg. Corp.
Cobb & Drew, Inc.
Corbin Screw Corp.
Dardelet Threadlock Corp.
Dill Mfg. Co.
Dzus Fastener Co.
Eaton Mfg. Co., Reliance Spring Washer Div.
Elastic Stop Nut Corp.
General Aircraft Supply Corp.
Goodrich Co., B. F.
Hartford Machine Screw Co.
Ideal Clamp Mfg. Co.
Jadson Motor Products Co.
Kenyon Instrument Co.
Mellus Bros. & Co.
Milford Rivet & Machine Co.
Palnut Co.
Parker-Kalon Corp.
Pollak Mfg. Co.
Scovill Mfg. Co.
Shakeproof Lock Washer Co.
Simmonds Aerocessories, Inc.
Streeter-Amet Co.
Thompson Products, Inc.
Tinnerman Products, Inc.
United-Carr Fastener Corp.
Waldes Koh-I-Noor, Inc.
Wittek Manufacturing Co.
Wrought Washer Mfg. Co.

Fences

American Chain & Cable Co.
American Steel & Wire Co.
Anchor Post Fence Co.
Cyclone Fence Co.
Highbridge-International Co.
Page Fence Assn.
Page Steel & Wire Div., American Chain & Cable Co.
Pittsburgh Steel Co.
Republic Steel Corp.
Stewart Iron Works Co.
Wickwire Spencer Steel Co.

Filters and Strainers

AC Spark Plug Div. General Motors Corp.
Adel Precision Products Corp.
Aeronautical Mfg. Corp.
Air-Maze Corp.
Aircraft Engineering Products, Inc.
Bogue Electric Co.
Cuno Engineering Corp.
Dover Stamping & Mfg. Co.
Dowty Equipment Corp.
Kellogg Switchboard & Supply Co.
Kraissl Co.
Newark Wire Cloth Co.
Purolator Products, Inc.
Rolock, Inc.
Tietzmann Engineering Co.
United Aircraft Products, Inc.
United Transformer Corp.

Finishes

Acme White Lead & Color Works
Aircraft Steel & Supply Co.
American Cellulose Co.
American Chemical Paint Co.
Arco Co.
Ault & Wiborg Corp.
Avondale Chemical Co.
Bakelite Corp.
Baltimore Paint & Color Works, Inc.
Barrett Varnish Co.
Berry Bros.
Brooklyn Varnish Mfg. Co.
Celluloid Corp.
Chicago Thrift Co.
Citrin & Sons, Charles
Colonial Alloys Co.
Cook Paint & Varnish Co.
Dibble Color Co.
du Pont de Nemours & Co., E. I. (Fabrics & Finishes Dept.)
Egyptian Lacquer Mfg. Co.
Fuller & Co., W. P.
General Aircraft Supply Corp.
General Paint Corp.
Glidden Co.
Goodrich Co., B. F.
Hilo Varnish Corp.
Jones-Dabney Co.
Kay & Ess Co.
Lowe Bros. Co.
Markal Co.
Monsanto Chemical Co., Merrimac Div.
Murphy Varnish Co.
Perry Austen Mfg. Co.
Phenix Aircraft Products Co.
Pierce & Stevens, Inc.
Pittsburgh Plate Glass Co.
Pratt & Lambert, Inc.
Pyroxylin Products, Inc.
Randolph Finishing Products Co.
Seidlitz Paint & Varnish Co.
Sewall Paint & Varnish Co.
Sherwin-Williams Co.
Skybryte Co.
Socony Paint Products Co.
Spray Engineering Co.
Titanine, Inc.
United States Radium Corp.
Valentine & Co.
Wailes Dove-Hermiston Corp.
Wesley Lacquer Co.
Wipe-On Corp.
Zapon Div., Atlas Powder Co.

Fire-Extinguishers—see Extinguishers, Fire

First-Aid, Kits and Supplies

Bauer & Black
Bullard Co., E. D.
Burroughs Wellcome & Co.
Davis Emergency Equipment Co.
First Aid Supply Co.
General Scientific Equipment Co.
Johnson & Johnson
Mine Safety Appliances Co.
Seabury, Inc.

Fittings, Control

Aeronautical Mfg. Corp.
Aeroquip Corp.
Agawam Aircraft Products, Inc.
Aircraft Development Co.
Aircraft Hardware Mfg. Co.
Anti-Corrosive Metal Products Co.
Arens Controls, Inc.
B. H. Aircraft Co.
Cosco Mfg. Co.
Dollin Corp.
Electroline Co.
Flex-O-Tube Co.
Harlow Aircraft Co.
Hartford Machine Screw Co.
L. M. Gear Co.
Macwhyte Co.
Mason Co., Thomas
McDonnell Aircraft Corp.
Parker Applianee Co.
Precision Products, Inc.
Siebenthaler Div., Aircraft Accessories Corp.
Simmonds Aerocessories, Inc.
Skylark Aircraft Corp.
Springfield Brass Co.
Standard Aircraft Products, Inc.
Tourek Mfg. Co., J. J.
Voges Mfg. Co.

Fittings, Structural

Agawam Aircraft Products, Inc.
Aircraft Products & Engrg. Corp.
Aircraft Steel & Supply Co.
Bailey Co.
Benton Co., L. F.
B. H. Aircraft Co.
Dollin Corp.
Harlow Aircraft Co.
McDonnell Aircraft Corp.
Packless Metal Products Corp.
Resistoflex Corp.
Reynolds Metals Co.
Siebenthaler Div., Aircraft Accessories Corp.
Simmonds Aerocessories, Inc.
Skylark Aircraft Corp.
Springfield Brass Co.
Standard Aircraft Products, Inc.
Steel Forming Corp.
Weatherhead Co.

Flares

American Armament Corp.
Backes' Sons, Inc., M.
Coston Supply Co.
Dollin Corp.
International Flare-Signal Div., Kilgore Mfg. Co.
Johnny's Parachute & Equipment Co.
New Jersey Fulgent Co.
Parachute Corp. of America
Pollak Mfg. Co.
Schwarzenbach Huber Co.
Standard Aircraft Equipment Co.
Triumph Explosives, Inc.

Floats and Skis

Air Transport Equipment, Inc.
B. H. Aircraft Co.
Brewster Aeronautical Corp.
Dahlstrom Metallic Door Co.
Edo Aircraft Corp.
Fahlin Mfg. Co.
Federal Aircraft Works
Fleetwings, Inc.
Heath Co.
Kirkham Engineering & Mfg. Corp.
Northill Co.
St. Louis Aircraft Corp.
United States Plywood Corp.
Washington Aircraft & Transport Corp.

Forgings

Airco Tool Co.
Aircraft Steel & Supply Co.
Allegheny Forging Co.
Aluminum Co. of America
Ampco Metal, Inc.
Atlas Drop Forge Co.
Bethlehem Steel Co.
Billings & Spencer Co.
Bridgeport Hardware Mfg. Corp.
Canton Drop Forging & Mfg. Co.
Champion Machine & Forging Co.
Chase Brass & Copper Co.
Clapp Mfg. Co., E. D.
Dow Chemical Co.
Endicott Forging & Mfg. Co.
Farrel-Birmingham Co.
Fitzgerald Mfg. Co.
General Metals Corp.
Govro-Nelson Co.
Harrisburg Steel Co.
Herbrand Corp.
Highbridge-International Co.
Interstate Drop Forge Co.
Jadson Motor Products Co.
Kropp Forge Co.
Ladish Drop Forge Co.
Lempco Products, Inc.
Magnesium Products, Inc.
Mondie Forge Co.
Moore Drop Forging Co.
National Aircraft Equipment Co.
Park Drop Forge Co.
Paulson Tools, Inc.
Revere Copper & Brass, Inc.
Rockwood Sprinkler Co.
Storms Drop Forging Co.
Shuler Axle Co.
Transue & Williams Steel Forging Corp.
Union Drawn Steel Steel Div., Republic Steel Corp.
Union Switch & Signal Co.
Weatherhead Co.
Western Forge & Tool Works
Williams & Co., J. H.
Wyman-Gordon Co.

Frames, Chair—see Seats

Fuels

Atlantic Refining Co.
Cities Service Oil Co.
Colonial Beacon Oil Co.
Esso Marketers
Ethyl Gasoline Corp.
Fiske Bros. Refining Co.
Fuel Development Corp.
Gulf Oil Corp.
Humble Oil & Refining Co., Aviation Dept.
Kendall Refining Co.
Pennzoil Co.
Phillips Petroleum Co.
Pure Oil Co.
Shell Oil Co.
Shell Petroleum Corp.
Sinclair Refining Co.
Socony-Vacuum Oil Co., Aviation Sales Dept.
Stanavo Specification Board, Inc.
Standard Oil Co. of Calif.
Standard Oil Co. (Indiana)
Standard Oil Co. of Ky.
Standard Oil Co. of La.
Standard Oil Co. of N. J.
Standard Oil Co. (Ohio)
Standard Oil Co. of Penna.
Texas Co.
Tidewater Associated Oil Co.
Union Oil Co. of California
Wolverine-Empire Refining Co.

Fuses, Electric—see Equipment, Aircraft Lighting also Equipment, Airport Lighting

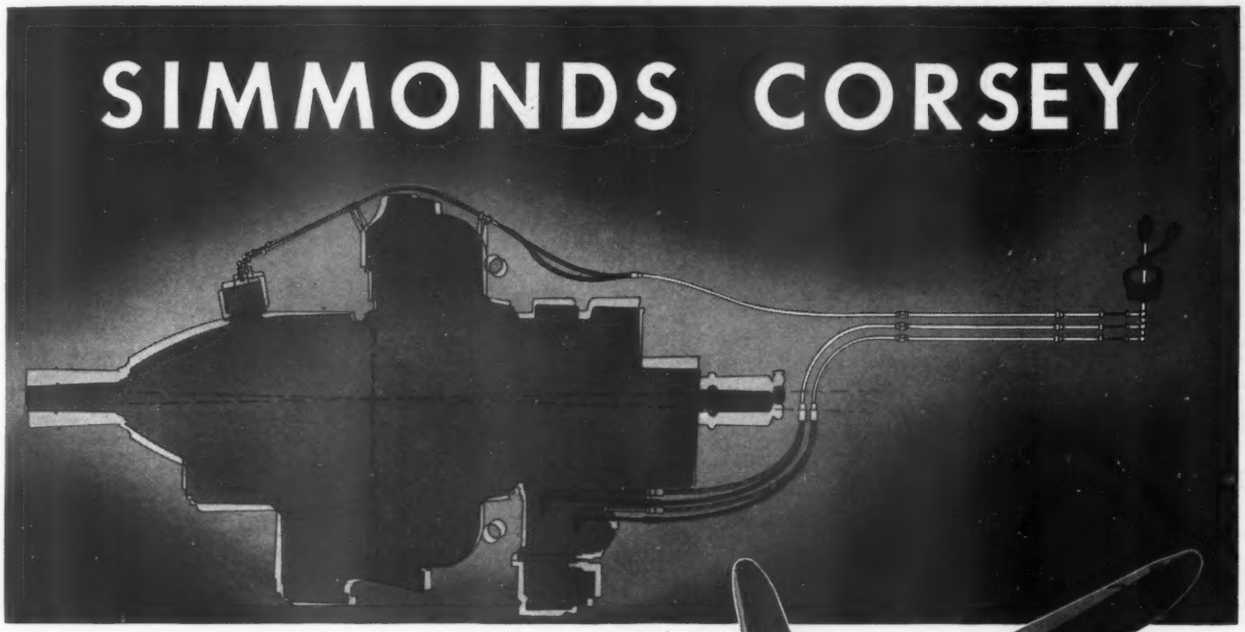
Gages
see also **Instruments**

Air Radio & Instrument Co.
Airco Tool Co.
American Instrument Co.
Bath & Co., John
Boston Auto Gage Co.
Connecticut Tool & Engrg. Co.
Dayton Type, Inc.
Electric Auto-Lite Co.
Federal Products Corp.
Florian Mfg. Co.
General Electric Co.
Kenyon Instrument Co.
Kollsman Instrument Div., Square D Co.
Liquidometer Corp.
Manning, Maxwell & Moore, Inc.
Monrad Engineering Co.
Production Tool & Die Co.
Rochester Mfg. Co.
Sheffield Gage Corp.
Simmonds Aerocessories, Inc.
Standard Aircraft Equipment Co.
Taft-Pierce Mfg. Co.
Tagliabue Mfg. Co., C. J.
Troy Tool & Gage Co.
Twin City Tool Co.
United Precision Products Co.
United States Gauge Co.
Vinco Corp.

Galvanizing, Plating etc.

Anchor Post Fence Co.
Buhl Stamping Co.
Chicago Thrift Co.
Commonwealth Industries
Dover Stamping & Mfg. Co.
National Postal Meter Co.
Norwich-Nickel-Chromium Plating Co.
Southern California Plating Co.

SIMMONDS CORSEY



the Control for CUSHIONED POWER

★ Illustrated above is a typical Simmonds-Corsey application to "cushioned" power. Note rigid conduit at actuating end, flexible conduit terminals at operating end.

Powered by the Pratt & Whitney Double Wasp, the most powerful engine ever installed in an airplane of its class, this new Vought-Sikorsky fighter for the U.S. Navy has been hailed as the fastest of them all.

Advanced in every detail of design and construction this new Vought-Sikorsky is notable for its "soft" engine mounting. As an integral part of this "cushioned" power plant, Vought-Sikorsky engineers have employed Simmonds-Corsey Flexible Controls for both throttle and mixture.

An illustrated bulletin descriptive of Simmonds-Corsey Controls will be sent without obligation if requested on your business letterhead.

SIMMONDS Aerocessories, Inc.

10 Rockefeller Plaza, New York, N. Y.

Pacific Coast Office: 72 North Tujunga Avenue, Burbank, California

Gaskets

Adel Precision Products Corp.
Air Transport Equipment, Inc.
Alpha Metal & Rolling Mills, Inc.
American Rubber Mfg. Co.
Colt's Patent Fire Arms Mfg. Co.
Connecticut Hard Rubber Co.
Crane Packing Co.
Detroit Gasket & Mfg. Co.
Dodge Cork Co.
Fitzgerald Mfg. Co.
Garlock Packing Co.
Gasket Shop
General Tire & Rubber Co.
Goetze Gasket & Packing Co.
Goodall Rubber Co.
Goodrich Co., B. F.
Houghton & Co., E. F.
House & Sons, Inc., Chas. W.
Johns-Manville
Linear Packing & Rubber Co.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
McCord Radiator & Mfg. Co.
Miller Mfg. Co.
National Vulcanized Fibre Co.
Permatex Co.
Resistoflex Corp.
Rogers Mfg. Co., Dayton
Standard Rubber Co.
Taylor Fibre Co.
Tietzmann Engineering Co.
Twin City Tool Co.
Vellumoid Co.
Victor Mfg. & Gasket Co.
Virginia Rubatex Corp.
Wilmington Fibre Specialty Co.

Gears and Pinions

Ampco Metal, Inc.
Cullman Wheel Co.
General Electric Co.
Indiana Gear Works
L M Gear Co.
Marquette Metal Products Co.
Michigan Tool Co.
National Postal Meter Co.
Taylor Machine Co.
Vinco Corp.

Generators

Air Radio & Instrument Co.
American Aircraft Radio, Div. of Searle Aero Industries, Inc.
Bogue Electric Co.
Carter Motor Co.
Century Electric Co.
Champion Aviation Products Co.
Eclipse Aviation Div. of Bendix Aviation Corp.
Eicor, Inc.
Electric Auto-Lite Co.
Electric Specialty Co.
General Aircraft Supply
General Armature Corp.
General Electric Co.
Ideal Electric & Mfg. Co.
Jack & Heintz Inc.
Lear Avia, Inc.
Moore-Eastwood & Co.
Quality Electric Co.
Standard Aircraft Equipment Co.
Westinghouse Electric & Mfg. Co.

Glass, etc.

American Window Glass Co.
Fuller & Co., W. P.
Libby-Owens-Ford Glass Co.
Nixon Nitration Works
Pittsburgh Plate Glass Co.
Protecto Safety Glass Co.
Rohm & Haas Co.
Safetee Glass Co.
Voges Mfg. Co.

Glues

Air Transport Equipment, Inc.
American Cellulose Co.
Avondale Chemical Co.
Catalin Corp.
Celluloid Corp.
Central Process Corp.
Citrin & Sons, Charles
Colonial Alloys Co.
Delaney & Co.
Firestone Tire & Rubber Co.
Fuller & Co., W. P.
General Construction Corp., Mfg. Div.
General Electric Co.
LePage's, Inc.
Monite Waterproof Glue Co.
Peiger, McCaw & Co.
Plaskon Co.
Rohm & Haas Co.

Goggles

American Optical Co.
Fischer Spring Co., Chas.
General Scientific Equipment Co.
Goggle Parts Co.
Mine Safety Appliances Co.
Sellstrom Co.
Willson Products, Inc.

Guns, Machine—see Armament and Equipment

Handbooks—see Charts and Handbooks

Hardware and Furnishings, Cabin

Air Transport Equipment, Inc.
Aircraft Products & Engrg. Corp.
Bailey Co.
Bemis & Call Co.
Corbin Screw Corp.
Denning Mfg. Co.
Dudley Lock Corp.
Fleetwings, Inc.
Inter-Continental Trade Co.
Johnson & Faulkner, Inc.
Mason Co., Thomas
Nixon Nitration Works
Parachute Corp. of America
Pixweve Aircraft Corp.
Rogers Mfg. Co., Dayton
Siebenthaler Div., Aircraft Accessories Corp.
Springfield Brass Co.

Heaters

Aeronautical Mfg. Corp.
Air Transport Equipment, Inc.
Airtherm Mfg. Co.
American Blower Corp.
American Heating & Ventilating Co.
American Instrument Co.
American Radiator Co.
Buffalo Forge Co.
Clarage Fan Co.
Cutler-Hammer, Inc.
G & O Mfg. Co.
General Electric Co.
Grinnell Co.
Ilg Electric Ventilating Co.
McQuay, Inc.
Modine Mfg. Co.
Solar Aircraft Co.
Standard Aircraft Products, Inc.
Sturtevant Co., B. F.
Trane Co.
United States Fire Protection Co.
United States Radiator Corp.
Utica Radiator Corp.
Westinghouse Electric & Mfg. Co.
Young Radiator Co.

Helmets—see Clothing and Uniforms

Horizons, Artificial—see Instruments

Hose, Metal—see Tubing, Flexible

Hose, Rubber

Aeroquip Corp.
Binks Mfg. Co.
Columbian Steel Tank Co.
Goodrich Co., B. F.
Goodyear Tire & Rubber Co.
Republic Rubber Div., Lee Rubber & Tire Corp.
Standard Rubber Co.
United States Rubber Co.

Ignition

Air Radio & Instrument Co.
American Bosch Corp.
Berling Magneto Co.
B G Corp
Electric Auto-Lite Co.
L. M. Gear Co.
Mallory & Co., P. R.
Molded Insulation Co.
Scintilla Magneto Div. Bendix Aviation Corp.
Standard Aircraft Equipment Co.

Indicators, Bank and Turn—see Instruments

Indicators, Wind

Air Radio & Instrument Co.
Air Transport Equipment, Inc.
General Tire & Rubber Co.
Johnny's Parachute & Equipment Co.
Kenyon Instrument Co.
Lights, Inc.
Robertson Aircraft Corp.
St. Louis Aircraft Corp.
Siebenthaler Div., Aircraft Accessories Corp.
Stewart, M. C.
Switlik Parachute & Equipment Co.

Instruments
see also Gages

AC Spark Plug Div. General Motors Corp.
Aero Research Wind Tunnel Co.
Aeromarine Instrument Co.
Air Radio & Instrument Co.
Air-Safe Aircraft Instruments
Aircraft Steel & Supply Co.
American Aircraft Radio, Div. of Searle Aero Industries, Inc.
American Instrument Co.
American Paulin System
Andrews Laboratories, E. F.
Anemostat Corp. of America
Barbour Stockwell Co.
Barnard Aviation Equipment Co.
Bausch & Lomb Optical Co.
Burton-Rogers Co. (sole distributors) Hoyt Electrical Instrument Works
Cambridge Instrument Co.
Chelsea Clock Co.
Consolidated Instruments Corp.
Corbin Screw Corp.
Cox & Stevens Aircraft Corp.
Cramer & Co., R. W.
Dayton Type, Inc.
Edison-Splitdorf Corp.
Electric Auto-Lite Co.
Elgin National Watch Co.
Engis Equipment Co.
Fairchild Aviation Corp.
Foxboro Co.
Friez & Sons, Julien P., Div. Bendix Aviation Corp.
Gaertner Scientific Corp.
General Electric Co.
Hays Corp.
Hickok Electrical Instrument Co.
Hoyt Electrical Instrument Works
Hurd Mfg. Corp., Mark
International Telephone Development Co.
Jaeger Watch Co.
Johnson National Insignia Co.
Jones-Motrola Sales Co.
Kenyon Instrument Co.
Kollsman Instrument Div., Square D Co.
Lear Avia, Inc.
Leeds & Northup Co.
Lewis Engineering Co.
Librascope, Inc.
Liquidometer Corp.
Lorenzen Propeller Co.
Manning, Maxwell & Moore, Inc.
Maxson Corp., W. L.
Moto Meter Gauge & Equipment Div. Electric Auto-Lite Co.
New Haven Clock Co.
Pacific Scientific
Permutit Co.
Photo Record Equipment Co.
Pioneer Instrument Co. Div. of Bendix Aviation Corp.
Rieker Instrument Co.
Ritchie & Sons, Inc., E. S.
Rochester Mfg. Co.
Rogers Mfg. Co., Dayton
Service Recorder Co.
Shore Instrument & Mfg. Co.
Siebenthaler Div., Aircraft Accessories Corp.
Sigma Instruments, Inc.
Simmonds Aerocessories, Inc.
Spencer Thermostat Co.
Sperry Gyroscope Co.
Standard Aircraft Equipment Co.
Standard Aircraft Products, Inc.
Star Compass Co.
Sundt Engineering Co.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Companies
Triplett Electrical Instrument Co.
Twin City Tool Co.
United Precision Products Co.
United States Gauge Co.
United States Radium Corp.
United Transformer Corp.
Vard Mechanical Laboratory
Voges Mfg. Co.
Waltham Watch Co.
Washington Institute of Technology, Inc.
Westinghouse Electric & Mfg. Co.
Weston Electrical Instrument Corp.

Instruments, Drafting Room—see Equipment and Supplies, Drafting Room

Insulation

American Felt Co.
American Hair & Felt Co.
American Phenolic Corp.
Anderson Flax Fiber Co.
Bakelite Corp.
Booth Felt Co.
Burgess Battery Co.
Detroit Gasket & Mfg. Co.
Dry-Zero Corp.
Felters Co.
Formica Insulation Co.
General Electric Co.
General Tire & Rubber Co.
Insulite, Div. of Minnesota & Ontario Paper Co.
Inter-Continental Trade Co.
Johns-Manville
Molded Insulation Co.
Owens-Corning Fiberglas Corp.
Reynolds Metals Co.
Seaman Paper Co.
Standard Felt Corp.
Technical Ply-woods
Virginia Rubatex Corp.
Western Felt Works
Westinghouse Electric & Mfg. Co.
Wilmington Fibre Specialty Co.

Jobbers

Aero Supply Mfg. Co.
Air Associates, Inc.
Air Transport Equipment, Inc.
Aircraft Steel & Supply Co.
Anderson Flax Fiber Co.
Atlas Brass Foundry
Bredouw Aeromotive Corp.
Campbell Hardware & Supply Co.
Cunningham-Hall Aircraft Corp.
Ducommun Metals & Supply Co.
Dycer Aviation Supplies
Garrett Supply Co.
Gillies Aviation Corp.
Johnson Airplane & Supply Co.
McFarlane Airplane Co.
Multifold Manufacturing Co.
National Aircraft Equipment Co.
National Airplane & Motor Co.
Ong Aircraft Corp.
Ort, Karl
Pacific Airmotive

Joints, Ball—see Fittings, Control

Landing Gears
see also Wheels and Brakes also Floats and Skis

Aircraft Accessories Corp.
Aircraft Development Co.
Aircraft Products & Engrg. Corp.
American-LaFrance-Foamite Corp.
American Tube Bending Co.
Ampco Metal, Inc.
Bakewell Mfg. Co.
Bendix Aviation, Ltd.
Dowty Equipment Corp.
Goodyear Tire & Rubber Co.
Heath Co.
Houde Engineering Corp.
Jack & Heintz, Inc.
Kay Products Co.
Lear Avia, Inc.
Michigan Tool Co.
National Acme Co.
Quality Electric Co.
Republic Aircraft Products, Div. of Aviation Corp.
Skylark Aircraft Corp.
Smith Henry Corp.
Thompson Products, Inc.
United Aircraft Products, Inc.

Lights and Accessories (Airport)

Air Associates, Inc.
Air Radio & Instrument Co.
Aircraft Steel & Supply Co.
American Cable Div. American Chain & Cable Co.
American Gas Accumulator Co., Electrical Div.
American Phenolic Corp.
Anaconda Wire & Cable Co.
Appleton Electric Co.
Arrow-Hart & Hegeman Electric Co.
Boston Insulated Wire & Cable Co.
Bull Dog Electric Products Co.
Claude Neon Lights, Inc.
Corning Glass Works
Crouse-Hinds Co.
Cutler-Hammer, Inc.
Douglas Mfg. Co., H. A.
Electric Auto-Lite Co.
Electric Service Supplies Co.
Electronic Laboratories, Inc.
Fostoria Pressed Steel Corp.
Gem City Sheet Metal & Mfg. Co.
General Cable Corp.
General Electric Co.
Hazard Insulated Wire Works Div. The Okonite Co.
Holophane Co.
Kellogg Switchboard & Supply Co.
Kenyon Instrument Co.
Kerite Insulated Wire & Cable Co.
Kliegel Bros.
Lights, Inc.
Littelfuse, Inc.
Mallory & Co., P. R.
National Carbide Corp.
Onan & Sons, D. W.
Photo Record Equipment Co.
Pollak Corp., Joseph
Pollak Mfg. Co.
Pyle-National Co.
Radiant Lamp Corp.
RLM Standards Institute
Roebling's Sons Co., John A.
Southern California Plating Co.
Standard Aircraft Equipment Co.
Standard Aircraft Products, Inc.
Sullivan Machinery Corp.
Union Carbide Co.
United States Radium Corp.
Westinghouse Electric & Mfg. Co.

Lockwashers—see Fasteners

Machine-Shops, Contract

Ace Hardware Mfg. Corp.
Agawam Aircraft Products, Inc.
Air Transport Equipment, Inc.
Airco Tool Co.
Aircraft Engineering Products, Inc.
Aircraft Machinery Corp.
Aircraft Products & Engrg. Corp.
Aircraft Tools, Inc.
All American Aircraft Products, Inc.
Alofs Mfg. Co.
Ampco Metal, Inc.
Anti-Corrosive Metal Products Co.
Apex Tool Co.
Auburn Central Manufacturing Corp.
Auto-Soler Co.
Bakewell Mfg. Co.
Barker Grinding Co.
Beaton & Corbin Mfg. Co.
Bennett Metal Treating Co.
Case Co., A. T.
Catskill Metal Works, Inc.
Challenge Machine Co.
Chowning Regulator Corp.
Coast Tool & Engineering Works
Commonwealth Industries
Connecticut Tool & Engrg. Co.
Cooper Alloy Foundry Co.
Corbin Screw Corp.
Cosco Mfg. Co.
Couse Laboratories, Inc.
Cunningham-Hall Aircraft Corp.
Dayton Type, Inc.
Denning Mfg. Co.
Ertel Machine Co.
Ex-Cell-O-Corp.
Fasoldt & Son, Dudley F.
Florian Mfg. Co.
Flynn & Emrich Co.
Forsberg Mfg. Co.
Graton & Knight Co.
Greist Mfg. Co.
Harlow Aircraft Co.
Hartford Machine Screw Co.
Hensle Machine & Tool Works, Emil
Hoe & Co., R.
Houde Engineering Corp.
Kenyon Instrument Co.
Ladish Drop-Forge Co.
Langley Instrument & Machine Co.
Lawson Machine & Tool Co.
Leahy, John W.

DESIGNED
FOR AVIATION...

TESTED
FOR AVIATION...

PROVED
UNDER AVIATION'S MOST EXACTING CONDITIONS

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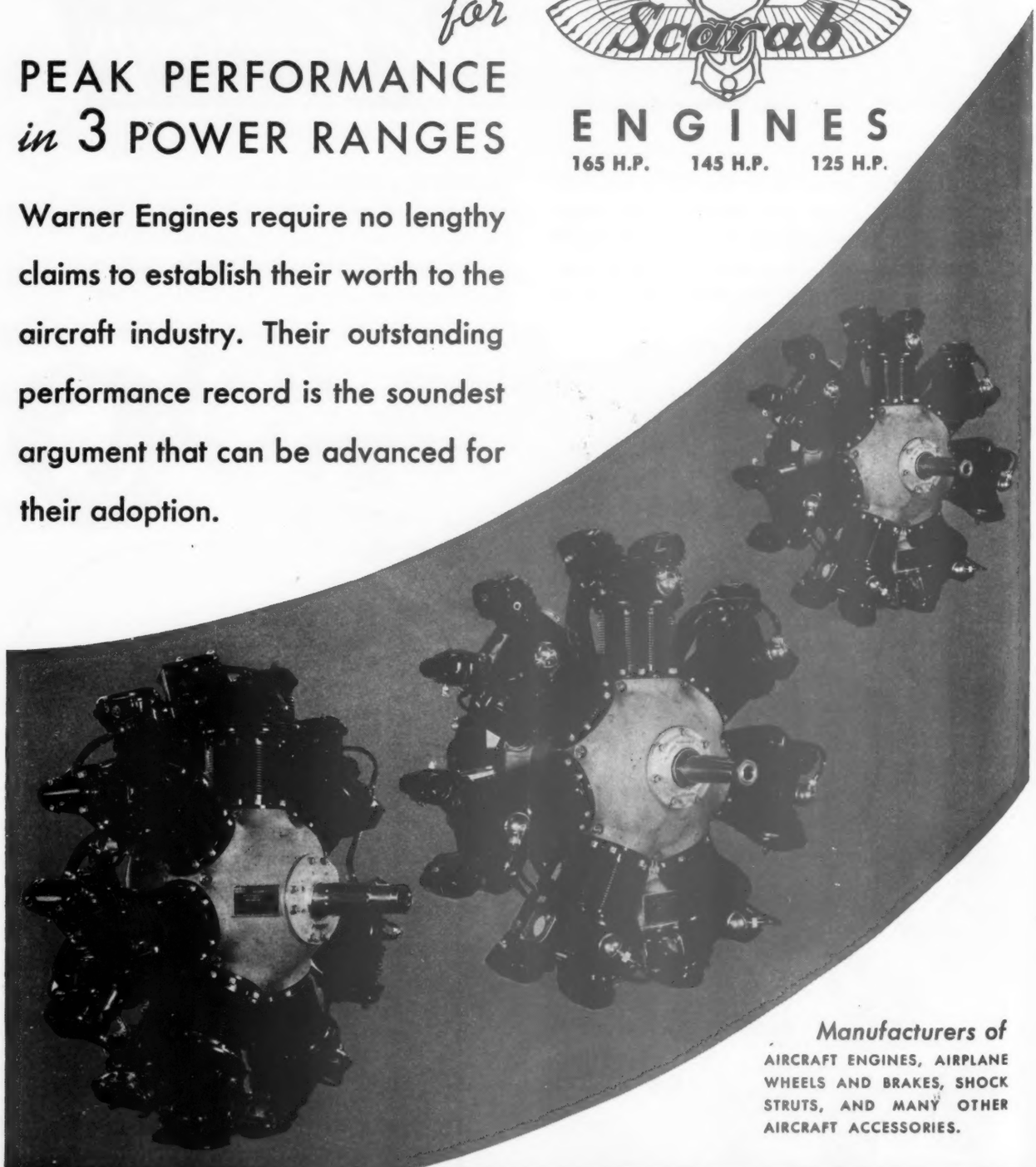

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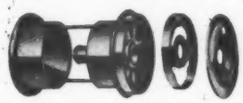

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Robertson Aircraft Corp.
Ryan Aeronautical Co.
Shinn Devices Co.
Tennessee Aircraft Institute, Inc.
Timm Aircraft Corp.
United States Rubber Co.
Young Spring & Wire Corp., L. A.

Shielding and Equipment, Radio

Air Radio & Instrument Co.
Air Shields, Inc.
Aluminum Goods Mfg. Co.
American Aircraft Radio, Div. of Searle Aero Industries, Inc.
American Cable Div. American Chain & Cable Co.
American Phenolic Corp.
American Transformer Co.
Belden Mfg. Co.
Bendix Aviation, Ltd.
Bogue Electric Co.
Boston Insulated Wire & Cable Co.
Breeze Corporations
Cinch Mfg. Corp.
Collins Radio Co.
Deutschmann Corp., Tobe
Doolittle Radio, Inc.
Drake Manufacturing Co.
Eitel-McCullough, Inc.
Electric Auto-Lite Co.
General Cable Corp.
General Radio Co.
General Tire & Rubber Co.
Goat Co., Fred
Harvey Radio Laboratories, Inc.
Kellogg Switchboard & Supply Co.
Kenyon Transformer Co.
Lorentzen Inc., H. K.
Molded Insulation Co.
Mallory & Co., P. R.
Mason Co., Thomas
National Co.
Ohmite Mfg. Co.
Packard Electric Div. General Motors Corp.
Radio Navigational Instrument Corp.
Runzel Cord & Wire Co.
Scintilla Magneto Div. Bendix Aviation Corp.
Selector Mfg. Corp.
Shure Brothers
Siebenthaler Div., Aircraft Accessories Corp.
Standard Aircraft Equipment Co.
Stratosearch, Inc.
Taylor Airphone Products, Inc.
Televiso Products, Inc.
Titeflex Metal Hose Co.
United Transformer Corp.
Universal Microphone Co.

Sights, Gun—see Armament and Equipment

Sirens—see Equipment, Airport

Skids—see Wheels and Skids, Tail

Skis—see Floats and Skis

Spark-Plugs

AC Spark Plug Div., General Motors Corp.
Aero Spark Plug Co.
Air Shields, Inc.
B. G. Corp
Benton Co., L. F.
Champion Spark Plug Co.
Doran Ignition Corp.
Edison-Splitdorf Corp.
Electric Auto-Lite Co.
Scintilla Magneto Div., Bendix Aviation Corp.
Simmonds Aerocessories, Inc.
Standard Aircraft Equipment Co.

Spars and Ribs

Baltic Metal Products Co.
Fleetwings, Inc.
Fletcher Aviation Corp.
Harlow Aircraft Co.
Inter-Continental Trade Co.
Johansen Aircraft Corp.
McDonnell Aircraft Corp.
National Aircraft Materials Corp.
Pixweve Aircraft Corp.
Posey & Co., J. V. G.
St. Louis Aircraft Corp.
Skylark Aircraft Corp.
Southern Aircraft Corp.
Threadgill Lumber Co., J. Percy
United States Plywood Corp.
Worcester Pressed Steel Co.
Yoho & Hooker Lumber Co.

Springs

Advance Spring Corp.
American Chain & Cable Co.
American Steel & Wire Co.
Anderson Flax Fiber Co.
Associated Spring Corp.
Barnes Co., Wallace Div. Associated Spring Corp.
Barnes-Gibson-Raymond Div. of Associated Spring Corp.
California Spring Co.
Chatillon & Sons, John
Collins Supply & Equipment Co.
Eaton Mfg. Co.
Fischer Spring Co., Chas.
Holister Coil Spring Mfg. Co.
Jones Spring Co., W. B.
Kline Spring Co.
Lee Spring Co.
Raymond Mfg. Co. Div. Associated Spring Corp.
Thomas Wire & Spring Co.
Tuthill Spring Co.
Wichita Wire Products Co.
Young Spring & Wire Corp., L. A.

Sprinklers

Grinnell Co.
Rockwood Sprinkler Co.

Stampings, Metal
see also Parts, Sheet Metal

Ace Hardware Mfg. Corp.
Acme Stamping & Mfg. Co.
Alofs Mfg. Co.
Aluminum Goods Mfg. Co.
Auburn Central Manufacturing Corp.
Austin Co., M. B.
B. H. Aircraft Co.
Baltic Metal Products Co.
Barnes-Gibson-Raymond Div. of Associated Spring Corp.
Brasco Mfg. Co.
Buhl Stamping Co.
Carll Son's, C. W.
Carpenter Mfg. Co., E. W.
Chase Brass & Copper Co.
Chicago Thrift Co.
Cinch Mfg. Corp.
Cleveland Metal Stamping Co.
Collins Supply & Equipment Co.
Corbin Screw Corp.
Dahlstrom Metallic Door Co.
Dayton Type, Inc.
Defiance Stamping Co.
Denning Mfg. Co.
Detroit Stamping Co.

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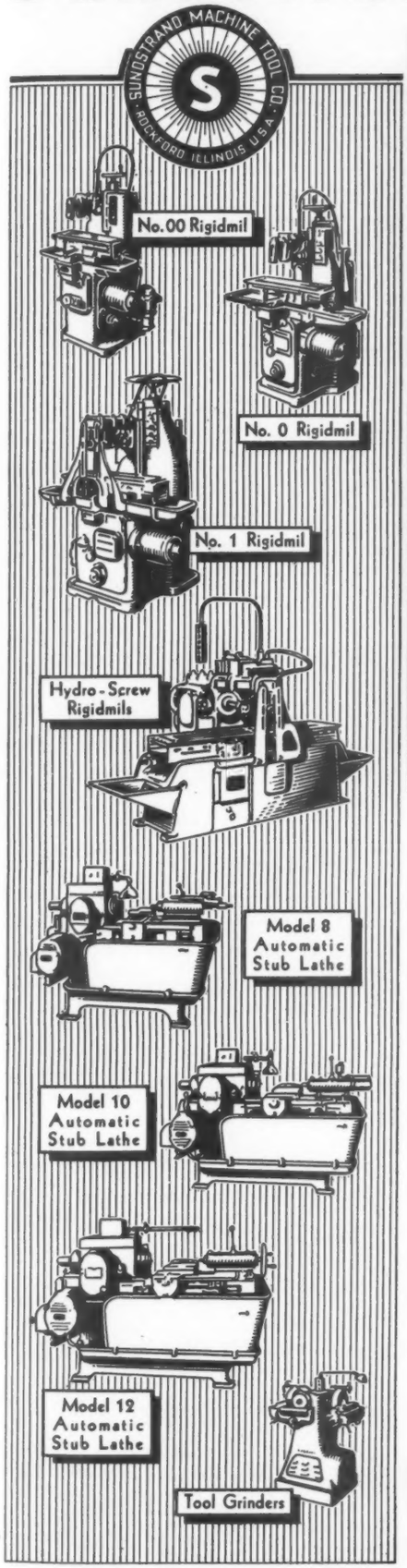

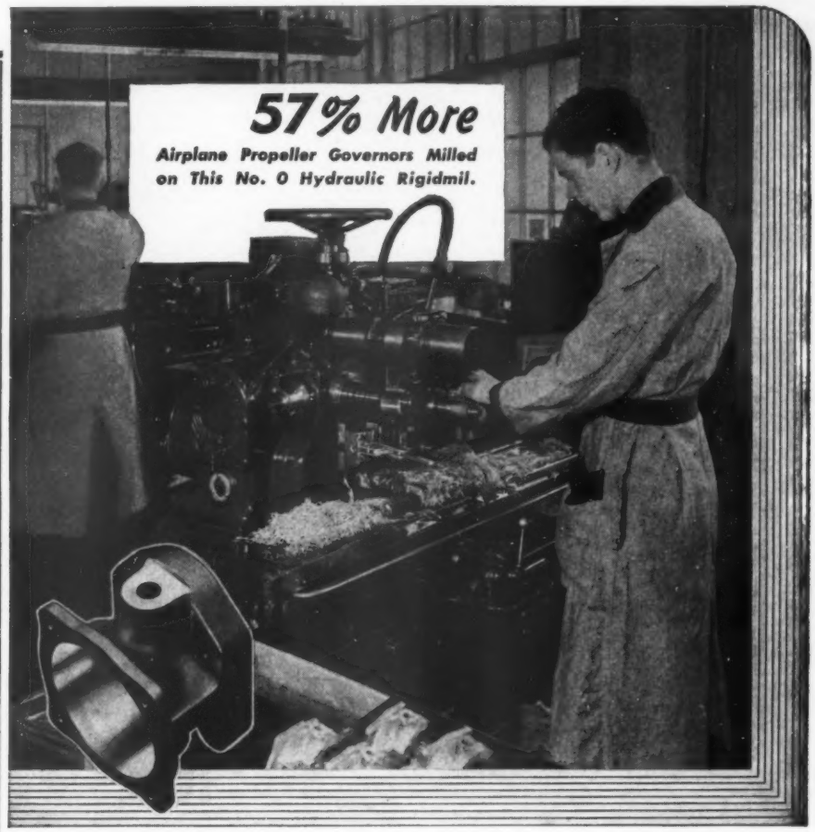

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Greist Mfg. Co.
Heim Co.
Hensle Machine & Tool Works, Emil
Heyman Mfg. Co.
Highbridge-International Co.
Holister Coil Spring Mfg. Co.
Kenyon Instrument Co.
Kirk & Blum Mfg. Co.
Konigslow Mfg. Co., Otto
Konigslow Stamping & Tool Co., E.
Laminated Shim Co.
Lansing Stamping Co.
Lorentzen, Inc., H. K.
Magosy & Buscher
Mechanical Development Co.
Met-L-Wood Corp.
Moore-Eastwood & Co.
Motors Metal Mfg. Co.
Mullins Mfg. Corp.
Murray Corp. of America
National Postal Meter Co.
Neu-Bart Stamping & Mfg. Co.
Northern Metal Products Co.
Otterbein, J. A.
Patton-MacGuyer Co.
Pollak Corp., Joseph
Pollak Mfg. Co.
Production Tool & Die Co.
Raymond Mfg. Co., Div. Associated Spring Corp.
Republic Steel Corp.
Reynolds Metals Co.
Robertson Aircraft Corp.
Rockwood Sprinkler Co.
Rogers Mfg. Co., Dayton
St. Louis Aircraft Corp.
Sal Metal Products Co.
Shakeproof Lock Washer Co.
Sparks-Withington Co.
Standard Aircraft Products, Inc.
Streeter-Amet Co.
Technical Products Co.
Teicher Mfg. Co.
Tietzmann Engineering Co.
Timm Aircraft Corp.
Transue & Williams Steel Forging Co.
Twin City Tool Co.
United-Carr Fastener Corp.
United Screw & Bolt Corp.
Voges Mfg. Co.
Wagner Mfg. Co., E. R.
Worcester Pressed Steel Co.
Worcester Stamped Metal Co.
Wrought Washer Mfg. Co.

Starters

Adel Precision Products Corp.
Aero Supply Mfg. Co.
Bogue Electric Co.
Breeze Corporations
Champion Aviation Products Co.
Eclipse Aviation Div., Bendix Aviation Corp.
Electric Auto-Lite Co.
Federal Laboratories, Inc.
General Armature Corp.
Jack & Heintz, Inc.
Siebenthaler Div., Aircraft Accessories Corp.
Standard Aircraft Equipment Co.

Strainers—see Filters and Strainers

Struts and Shock Cord

Aircraft Steel & Supply Co.
Bendix Products Div. Bendix Aviation Corp.
Cleveland Pneumatic Tool Co.
Dowty Equipment Corp.
Fletcher Aviation Corp.
Goodrich Co., B. F.
Hayes Industries, Inc.
Houde Engineering Corp.
Randall Graphite Products Corp.
Reda Mfg. Co.
Russell Mfg. Co.
United Aircraft Products, Inc.

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Superchargers and Equipment, Cabin

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Lawrance Engrg. & Research Corp.
McCulloch Engrg. Co.
General Electric Co.
Lear Avia, Inc.
Turbo Engineering Corp.

Surfaces, Wing and Control

Carll Son's, C. W.
Fleetwings, Inc.
Harlow Aircraft Co.
McDonnell Aircraft Corp.
St. Louis Aircraft Corp.
Stainless Steel Aircraft Corp.
United States Plywood Corp.

Switches

American Phenolic Corp.
Arrow-Hart & Hegeman Electric Co.
Clarostat Mfg. Co.
Cole-Hersee Co.
Cramer Co., R. W.
Daven Co.
Deutschmann Corp., Tobe
Douglas Mfg. Co., H. A.
Durakool, Inc.
Eclipse Aviation Div. Bendix Aviation Corp.
Electric Auto-Lite Co.
General Electric Co.
Guardian Electric Mfg. Co.
Kellogg Switchboard & Supply Co.
Leach Relay Co.
Lewis Engineering Co.
Mallory & Co., P. R.
Molded Insulation Co.
Pollak Corp., Joseph
Pollak Mfg. Co.
Pyle-National Co.
Quality Electric Co.
Rhodes, Inc., M. H.
Scintilla Magneto Div., Bendix Aviation Corp.
Standard Aircraft Equipment Co.
States Co.
Twin City Tool Co.
Western Electric Co., Specialty Products Div.
Westinghouse Electric & Mfg. Co.

Synthetics

American Cellulose Co.
American Phenolic Corp.
Avondale Chemical Co.
Bakelite Corp.
Brooklyn Varnish Mfg. Co.
Catalin Corp.
Celluloid Corp.
Central Process Corp.
Continental-Diamond Fibre Co.
Connecticut Hard Rubber Co.
Detroit Gasket & Mfg. Co.
du Pont de Nemours & Co., E. I., Plastics Dept.
Egyptian Lacquer Mfg. Co.
Firestone Tire & Rubber Co.
Formica Insulation Co.
Fuller & Co., W. P.
General Electric Co.
Goodall Rubber Co.
Goodrich Co., B. F.
Hilo Varnish Corp.
Irvington Varnish & Insulator Co.
Monsanto Chemical Co., Merrimac Div.
Plaskon Co.
Pyroxylin Products, Inc.
Resistoflex Corp.
Seiberling Rubber Co.
Spalding Fibre Co.
Standard Rubber Co.
Wesley Lacquer Co.
Westinghouse Electric & Mfg. Co.

Systems, Aircraft Fuel

American Bosch Corp.
Bendix Products Div. Bendix Aviation Corp.
Lunkenheimer Co.
Motor Improvements, Inc.
Protecto Seal Co.
Pump Engineering Service Corp.
Romec Pump Co.
Steel Products Engineering Co.

Systems, Airport Fuel

Aqua Systems, Inc.
Aro Equipment Corp.
Bowser & Co., S. F.
Butler Mfg. Co.
Columbian Steel Tank Co.
Consolidated Instruments Corp.
Flotation Systems, Inc.
Gilbert & Barker Mfg. Co.
Liquidometer Corp.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
Motor Improvements, Inc.
Protecto Seal Co.
Pump Engineering Service Corp.
Romec Pump Co.
Steel Products Engineering Co.
Swift Lubricator Co.
Twin City Tool Co.
United States Fire Protection Co.
Voges Mfg. Co.
Yale & Towne Mfg. Co.

Systems, Sprinkler—see Sprinklers

Systems, Water—see Plumbing, Fixture and Fitting

Tachometers—see Instruments

Tanks, Fuel

Aero Trades Co.
Aircraft Development Co.
Aluminum Co. of America
Aluminum Goods Mfg. Co.
American-LaFrance-Foamite Corp.
B. H. Aircraft Co.
Benson Mfg. Co.
Bethlehem Steel Co.
Breeze Corporations
Brewster Aeronautical Corp.
Buhl Stamping Co.
Carll Son's, C. W.
Columbian Steel Tank Co.
Dahlstrom Metallic Door Co.
Firestone Tire & Rubber Co.
Fleetwings, Inc.
Fletcher Aviation Corp.
Goodrich Co., B. F.
Harlow Aircraft Co.
Heron Manufacturing Co.
Independent Iron Works
Ingalls Iron Works Co.
International Engineering Works, Inc.
Kay Products Co.
Kirk & Blum Mfg. Co.
Met-L-Wood Corp.
National Postal Meter Co.
Photo Record Equipment Co.
Pollak Mfg. Co.
Porcupine Co.
Robertson Aircraft Corp.
Ryan Aeronautical Co.
St. Louis Aircraft Corp.
Standard Aircraft Products, Inc.
Tennessee Aircraft Institute, Inc.
United States Rubber Co.
Virginia Rubatex Corp.

Terminals, Tie Rod—see Fittings, Structural

Tires and Tubes

Firestone Tire & Rubber Co.
General Tire & Rubber Co.
Goodrich Co., B. F.
Goodyear Tire & Rubber Co.
Musselman Products Co.
United States Rubber Co.

Tools, Machine—see Equipment, Shop

Tractors and Snow Removal Equipment

Automatic Transportation Co.
Baker Industrial Truck Div. of Baker-Raulang Co.
Caterpillar Tractor Co.
Clark Tructractor, Div. Clark Equipment Co.
Cleveland Tractor Co.
Four Wheel Drive Auto Co.
International Harvester Co.
Klauer Mfg. Co.
Oliver Farm Equipment Co.
Rocky Mountain Steel Products, Inc.
Snow Removal Equipment Co.
Towmotor Co.

Trainers

Cessna Aircraft Co.
Ensign Aircraft Corp.
Fleetwings, Inc.
Fletcher Aviation Corp.
Harlow Aircraft Co.
Interstate Aircraft & Engrg. Corp.
J. V. W. Corp. (Distributor)
Johansen Aircraft Corp.
Link Aviation Devices, Inc.
Pixweve Aircraft Corp.
St. Louis Aircraft Corp.
Skylark Aircraft Corp.
Timm Aircraft Corp.

Tubes—see Tires and Tubes

Tubing (Flexible)

Air Transport Equipment, Inc.
Aircraft Steel & Supply Co.
American Brass Co.
American Metal Hose Div., American Brass Co.
Breeze Corporations
Chase Brass & Copper Co.
Chicago Metal Hose Corp.
Eclipse Aviation Div. Bendix Aviation Corp.
Flex-O-Tube Co.
Forsyth Metal Goods Co.
Nicralumin Co.
Packless Metal Products Corp.
Pennsylvania Flexible Metallic Tubing Co.
Resistoflex Corp.
Saylor Electric Products Corp.
Seamlex Co.
Shakespeare Products Co.
Titeflex Metal Hose Co.
United Metal Hose Co.
United Wire & Supply Corp.
Weatherhead Co.
Wolverine Tube Co.

Tubing (Rigid Non-Ferrous)

Aircraft Steel & Supply Co.
Aluminum Co. of America
American Brass Co.
Brasco Mfg. Co.
Chase Brass & Copper Co.
Chicago Metal Hose Corp.
Colonial Alloys Co.
Dahlstrom Metallic Door Co.
Dow Chemical Co.
Ducommun Metals & Supply Co.
Formica Insulation Co.
National Copper & Smelting Co.
Nicralumin Co.
Pacific Metals Co.
Phosphor Bronze Smelting Co.
Revere Copper & Brass, Inc.
Reynolds Metals Co.
Superior Tube Co.
United Wire & Supply Corp.
Wells & Co., A. H.
Westinghouse Electric & Mfg. Co.
Wilmington Fibre Specialty Co.
Wolverine Tube Co.

Tubing (Rigid Steel)

Aircraft Steel & Supply Co.
Baker Steel & Tube Co.
Bethlehem Steel Co.
Brasco Mfg. Co.
Carpenter Steel Co.
Columbia Steel Co.
Dahlstrom Metallic Door Co.
National Tube Co.
Ohio Seamless Tube Co.
Pittsburgh Steel Co.
Republic Steel Corp.
Ryerson & Son, Inc., Joseph T.
Service Steel Co.
Steel Forming Corp.
Summerill Tubing Co.
Superior Tube Co.
Timken Roller Bearing Co.

Tubing, Rubber—see Rubber

Tubing, Streamline—see Tubing, (Rigid Non-Ferrous) also Tubing (Rigid Steel)

Uniforms—see Clothing and Uniforms

Valves

Acrotorque Co.
Adel Precision Products Corp.
Aeronautical Mfg. Corp.
Aircraft Engineering Products, Inc.
Airesearch Mfg. Co.
Aluminum Industries, Inc.
American-LaFrance-Foamite Corp.
Aro Equipment Corp.
Burdett Mfg. Co.
Dill Mfg. Co.
Dowty Equipment Corp.
Eaton Mfg. Co.
Fairbanks Co.
Fleetwings, Inc.
Homestead Valve Mfg. Co.
Hoof Products Co.
Interstate Aircraft & Engrg. Corp.
Jadson Motor Products Co.
Kenyon Instrument Co.
McQuay-Norris Mfg. Co.
Milwaukee Valve Co.
Parker Appliance Co.
Pump Engrg. Service Corp.
Sealed Power Corp.
Siebenthaler Div., Aircraft Accessories Corp.
Standard Aircraft Products, Inc.
Tagliabue Mfg. Co., C. J.
Thompson Products, Inc.
United Aircraft Products, Inc.
Vickers, Inc.
Walworth Co.
Weatherhead Co.
Wilcox-Rich, Div. of Eaton Mfg. Co.

Washers, Shock

Anderson Flax Fiber Co.
Goodrich Co., B. F.
Houghton & Co., E. F.
Linear Packing & Rubber Co.
Lord Mfg. Co.
Standard Rubber Co.
Streeter-Amet Co.
Thompson Products, Inc.
Twin City Tool Co.

Wheels and Brakes

Bendix Products Div. Bendix Aviation Corp.
Dayton Wheel Co.
Federal Aircraft Works
Firestone Tire & Rubber Co.
General Aircraft Supply Corp.
General Tire & Rubber Co.
Geneva Metal Wheel Co.
Goodrich Co., B. F.
Goodyear Tire & Rubber Co.
Hayes Industries, Inc.
National Acme Co.
Shinn Devices Co.
Variety Aircraft Corp.
Wagner Electric Corp.
Warner Aircraft Corp.

Wheels, Control

Kay Products Co.
Uniloy Accessories Corp.

Wheels and Skids, Tail

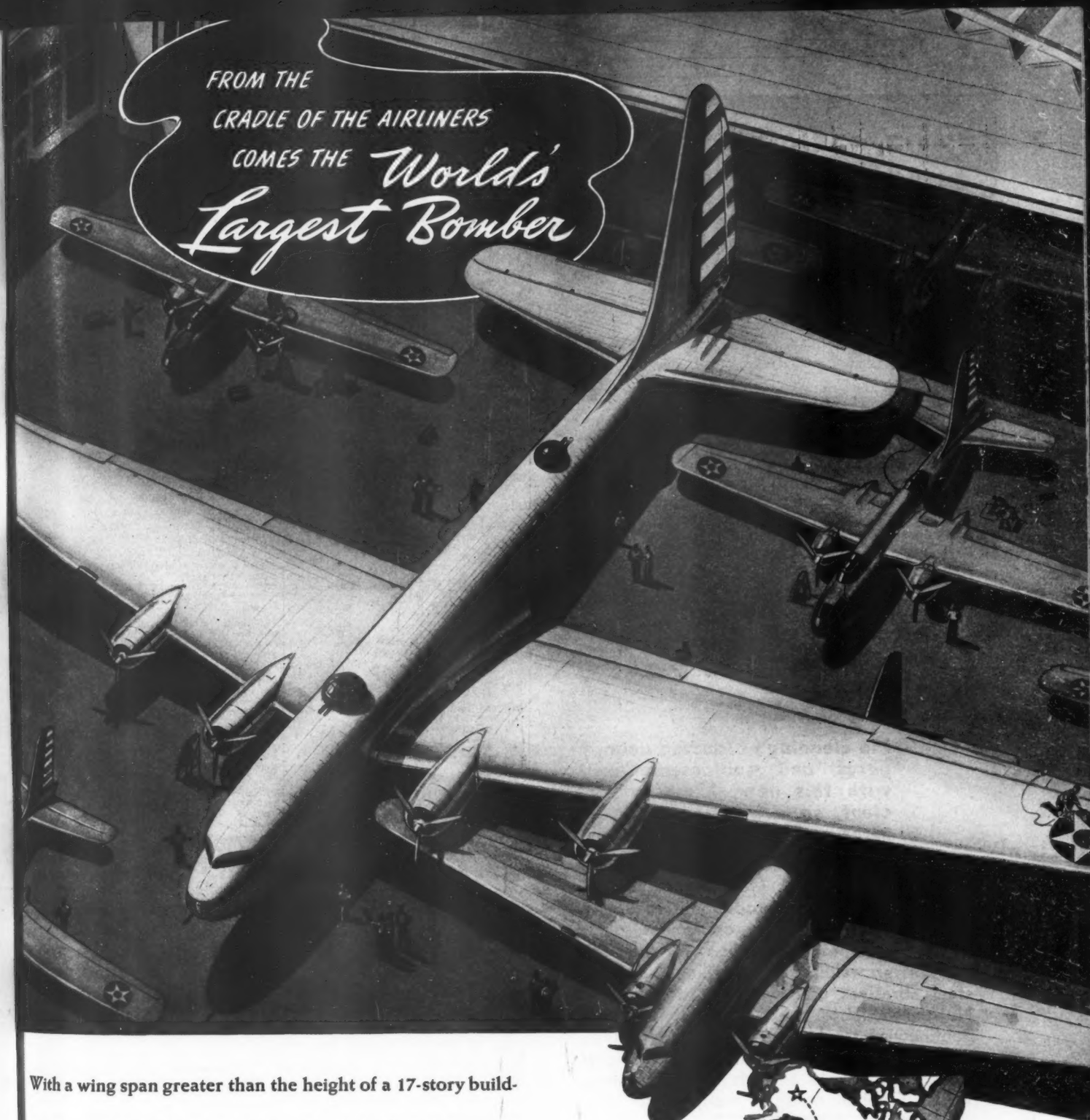
Air Transport Equipment, Inc.
Aircraft Associates, Inc.
American Tube Bending Co.
Dowty Equipment Corp.
Firestone Tire & Rubber Co.
General Tire & Rubber Co.
Geneva Metal Wheel Co.
Goodrich Co., B. F.
Goodyear Tire & Rubber Co.
Harlow Aircraft Co.
Hayes Industries, Inc.
Houde Engineering Corp.
Interstate Aircraft & Engrg. Corp.
Kay Products Co.
National Acme Co.
Shinn Devices Co.
Tennessee Aircraft Institute, Inc.
Uniloy Accessories Corp.

Wire and Cable, Electrical

AC Spark Plug Div. General Motors Corp.
Accurate Insulated Wire Co.
American Phenolic Corp.
American Steel & Wire Co.
Austin Co., M. B.
Belden Mfg. Co.
Boston Insulated Wire & Cable Co.
Chase Brass & Copper Co.
Collyer Insulated Wire Co.
Crescent Co.
Electric Auto-Lite Co., Wire Div.
General Electric Co.
Kellogg Switchboard & Supply Co.
Okonite Co.
Roebling's Sons Co., John A.
Runzel Cord & Wire Co.
Simplex Wire & Cable Co.
United States Rubber Co.

Wire and Cable, Structural

Aircraft Steel & Supply Co.
American Chain & Cable Co.
American Steel & Wire Co.
Anti-Corrosive Metal Products Co.
Arens Controls, Inc.



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Page Steel & Wire Div., American Chain & Cable Co.
Phosphor Bronze Smelting Co.
Republic Steel Corp.
Revere Copper & Brass, Inc.
Rochester Ropes, Inc.
Roebling's Sons Co., John A.
Wickwire Spencer Steel Co.

Wood and Plywood
see also **Parts, Fabricated Plywood**

Air Transport Equipment, Inc.
Algoma Plywood & Veneer Co.
Auld Co., D. L.
Burnside Veneer Co.
California Panel & Veneer Co.
Catalin Corp.
Durez Plastics & Chemicals, Inc.
Eggers Plywood & Veneer Co., F.
Fletcher Aviation Corp.
Formica Insulation Co.
Harbor Plywood Corp.
Haskelite Mfg. Corp.
Inter-Continental Trade Co.
Met-L-Wood Corp.
Morgan Lumber Products Co.
National Aircraft Materials Corp.
Paxton Lumber Co., Frank
Plywood Products Corp.
Posey & Co., J. V. G.
Roddis Lumber & Veneer Co.
Stanton & Son, Inc., E. J.
Technical Ply-Woods
United States Plywood Corp.
White Brothers
Yoho & Hooker Lumber Co.

AVIATION SCHOOLS

Continued from page 182

National Aeronautics Council Inc., 37 W. 47th St., New York, N. Y.
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Registrar—M. J. Maher
C

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Pres.—A. A. Price
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M, MM

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Joe Plosser Air Service, 1435 Flower St., Glendale, Calif.
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Pres.—W. D. Guthrie
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A, E, F, I, MM, B, Y

Sansom Technical Trade School, Inc., 135 Charter Oak Ave., Hartford, Conn.
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Registrar—Irving Sansom
M, MM

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Stinson School of Aviation, 21 44th Ave., Long Island City, N. Y.
Pres.—Jack B. Stinson
Registrar—David E. Towle
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Swallow Airplane Co., Inc., Training Division, 917 East Lincoln, Wichita, Kans.
Pres.—Sam Bloomfield
Registrar—L. R. Wilson
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Pres.—Ira E. Taylor
Registrar—John Laughlin
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Tri-State College, Angola, Ind.
Pres.—Burton Handy
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Pres.—W. S. Collier
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Pres.—George H. Watson
Registrar—C. E. Moss
M

Western Air College, 620 E. Valley Blvd., Alhambra, Calif.
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Pres.—Gordon D. Brown
Registrar—H. C. Stolee
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Wichita Aircraft School, 727 E. Harry St., Wichita, Kans.
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Registrar—Harry Dunlap
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